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**GENERAL DYNAMICS**  
*Convair Division*

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PROPULSION SYSTEM  
AIRBORNE  
DIFFICULTIES REVIEW

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GENERAL INFORMATION. Volume XII.

DIFFICULTIES REVIEW ATLAS BOOSTER  
AIRBORNE AND GROUND SUPPORT SYSTEMS.

BOOK II.

GENERAL INFORMATION. *Volume XII.*

Propulsion System Airborne Difficulties  
Review.

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Per Hx on file

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*E. B. Shaffer*  
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Chief of reliability Engineering

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BOOK II - DIFFICULTIES REVIEW - AIRBORNE CONTAINS THE FOLLOWING VOLUMES

VOLUME I	AIRFRAMES
*VOLUME II	ABORT SENSING AND IMPLEMENTATION SYSTEM
VOLUME III	AUTOPILOT
*VOLUME IV	AUXILIARY POWER SOURCE
VOLUME V	ELECTRICAL
*VOLUME VI	GUIDANCE
VOLUME VII	HYDRAULICS
VOLUME VIII	INSTRUMENTATION
VOLUME IX	PNEUMATICS
VOLUME X	PROPELLANT UTILIZATION
VOLUME XI	PROPULSION INTERFACE
VOLUME XII	PROPULSION ✓
VOLUME XIII	<u>RANGE SAFETY COMMAND</u>

\*VOLUMES II, IV AND VI UNDER ONE COVER.

## GENERAL INFORMATION

The Difficulties Review encompasses problems gathered from the factory, the field, (ETR and WTR) and UTP. The factory difficulties are limited to "selloff" and rerun composite testing.

In the UTP area, the difficulties were excerpted from Central Test Control Reports, Problem Reports, Supplementary History Sheets and Problem Review Reports.

Field problems for the Difficulties Review have been limited to captive flights, flight readiness firings, actual countdown dual propellant loading, quad tanking, component reliability testing, and flight acceptance composite tests. Difficulties called out in the search for critical weakness program was not documented.

GSE problems shall be limited to ETR Complex 12, 13, 36A and 36B for the present edition. Hereafter only booster difficulties shall be maintained.

Failure analysis reports cover difficulties from the field and factory and may complement the information above.

The GSE Difficulties Review, Book 1 contains 14 Volumes, one volume for each system, under one cover. Each volume is appropriately indexed.

The Airborne Difficulties Review, Book 2 contains 13 volumes. Each volume is under separate cover except Volumes II, IV and VI. Volumes II, IV, and VI are under one cover because of the limited material contained in each volume. All volumes are appropriately indexed.

A guide to facilitate interpretation of data in the Difficulties Review (GSE and Airborne) is part of each book or volume.

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**GENERAL DYNAMICS**  
**Convair Division**

**Subject:       Explanatory Information For Use of Difficulties Review (DR)**  
**Data Tab Runs**

**This information has been prepared to facilitate use of the DR. It is not intended to describe how the DR was prepared nor the scope of the existing effort.**

**The Difficulties Review (DR) is presented on a form compatible with automated data processing and printout.**

**Appearing at the top of the page (outside of blocked-in areas) is the identification of the system and whether it is Airborne or Ground Support Equipment. Appearing with this identification is the date of the document and the page number.**

**On the right hand side outside of the blocked area, appears the abstract number. An abstract number is assigned to each item of the Difficulty Review to facilitate traceability to the original input document.**

**Appearing under the major identification are blocks wherein the information on component or system difficulty is identified and explained. Attached are samples of pages coded for reference to the following definitions and explanations:**

**CODE**

**EXPLANATION**

**①**

**This group of blocks callout system, subsystem, test/report number, failed component name, difficulty (Dif) data source, and GDC part number if applicable. Also called out here is the vehicle number, if applicable, and the date of difficulty.**

**In the same row, the site location, and in case of a flight, captive flight, or countdown, the time will be entered.**

**The block containing PRI and OTH refer to whether or not the failure is primary or a secondary failure. A secondary failure is to be interpreted as caused by another discrepancy.**

**The last block in this row is obvious and requires no further explanation:**

**②**

**Refers to a major system of the launch vehicle.**

**③**

**Refers to subsystem of a major vehicle system if applicable, (Booster, sustainer, etc).**

GENERAL DYNAMICS  
CORVALLIS DIVISION

**DIFFICULTIES REVIEW-GUANOKE SYSTEM-AIRBORNE**

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE OF TIME	BIT TIME	PRI OTH	VENDOR NAME VENDOR PART NO
VEHICLE EFFECT-COUNTDOWN ABORTED.						
CORRECTIVE ACTION-DECODER REPLACED.						
GUIDANCE-GE MOD 1111A-A/B DECODER	ARI41-0-107/PC-4CO-01-107 DECODER	COMPOSITE-FACTORY	107D 820107	FACTORY	YES NO	GENERAL ELECTRIC IC 704104861
FAILURE MODE-PREATURE OPERATION-DECODER RELAYS 1 AND 2 WERE ACTIVATED THROUGHOUT THE TEST. THE RELAYS WERE ACTUATED WHENEVER POWER WAS APPLIED TO THE DECODER-THIS WAS A MODEL 111A TYPE UNIT.						
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS-DECODER OUTPUT COMMANDS APPEARED WITHOUT INPUT STIMULUS.						
VEHICLE EFFECT-COMPOSITE DELAYED. ADDITIONAL SYSTEM TEST REQUIRED.						
CORRECTIVE ACTION-THE DECODER WAS REJECTED AND REPLACED.						
GUIDANCE-GE MOD 111A-A/B DECODER	A481-0110/PA-4CO-01-04 DECODER	COMPOSITE-B FACT	840 510807	14/ETR	YES NO	GENERAL ELECTRIC IC
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. DURING FACT, DISCRETES 1 AND 2 DID NOT APPEAR AT DECODER OUTPUT. CAUSE UNKNOWN.						
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS.						
VEHICLE EFFECT-COMPOSITE DELAYED. TEST DELAYED TO REPLACE DECODER AND PULSE BEACON.						
CORRECTIVE ACTION-REPLACE DECODER AND PULSE BEACON.						
GUIDANCE-GE MOD 111A-A/B DECODER	A260-0811/PC-4CO-02-077 DECODER	COMPOSITE-FACTORY	77D 600908	FACTORY	NO NO	GENERAL ELECTRIC IC
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME-STAGING LOCKOUT AND ETAGING DISCRETE SIGNALS WERE NOT GENERATED DUE TO FAULTY MESSAGE STRUCTURES IN THE C. O. T. S. (AGE).						
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS						
VEHICLE EFFECT-COUNTDOWN OR COMPOSITE DELAYED OR RE-SCHEDULED. POST-COMPOSITE TESTING WAS REQUIRED.						
CORRECTIVE ACTION-MESSAGE REGISTER WAS REPAIRED.						
GUIDANCE-GE MOD 111A-A/B DECODER	LM80-448882-B/PA-4CO-02-48 DECODER	COMPOSITE-J FACT	45D 800J11	14/ETR	YES NO	GENERAL ELECTRIC IC 44000303082
FAILURE MODE-ERRATIC OPERATION. DURING INTERROGATION OF DECODER, IT RESPONDED TO TWO DIFFERENT ADDRESSES WHEN IT SHOULD HAVE RESPONDED ONLY TO ONE.						

## GENERAL DYNAMICS

Convair Division

<u>CODE</u>	<u>EXPLANATION</u>
④	Is a report number as opposed to type of report, (UTP, Countdown, Flight, FAR, etc.).
⑤	Is a type of report, such as a FAR, UTP, FRF, etc.
⑥	Refers to a component part by name.
⑦	Is a component piece part of the component and referred to by name, (plug, seal, wiring, diode, etc., only where applicable).
⑧	Is a GDC part number, if applicable.
⑨	Refers to a site or location at time of discrepancy on the component or vehicle system.
⑩	Is the vehicle on which discrepancy occurred. Vehicle number listed only if unit was installed on a vehicle at time of discrepancy.
⑪	Is the vendor part number, if applicable.
⑫	Is the vendor name, if applicable.
⑬	Is the failure caused by other component or other system. This item defines the failure as secondary or not secondary.
⑭	<p>Refers to the primary failure. If item is labeled <u>no</u>, then item (13) may appear as a <u>yes</u>.</p> <p>Should item (13) appear as a <u>yes</u>, then an abstract will have been written to identify the cause of failure affecting the component referred to in the Difficulty Review, Item 6. It should be noted that a multiple failure may be recorded in these blocks, (yes/yes), or if a failure did not occur, (no/no).</p>
⑮	<p>Defines the failure mode, and if identifiable, the cause is called out. A careful review of the failure mode is made to determine effect on system operation and vehicle effort.</p>

## GENERAL DYNAMICS

Convair Division

### CODE

### EXPLANATION

16

Defines the system effect. This effect is the result of the failure mode assigned to the component.

17

Defines the vehicle effect. This effect is a result of the failure mode and the result of the system effect.

It should be noted that corrective action may be taken whether or not the failure was confirmed.

18

Lists the corrective action. Taken by GDC, the vendor, or both.

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GENERAL DYNAMICS  
CONVAIR DIVISION

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## DIFFICULTIES REVIEW-HYDRAULIC SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	DATE TIME DIP	VEHICLE NAME VEHICLE PART NO
1	HYDRAULIC-A/B BOOSTER	2FA3977 HYDRAULIC PUMP	001889	CONVAIR	YES VICKERS NO AA-00004-R-BA	007076
2						
3						
4						
5						
6	HYDRAULIC-A/B BOOSTER	8LV-AB-10-269F HYDRAULIC PUMP/SEAL	PAR 87-00000-1	FACTORY	YES VICKERS NO AA-00004-R-BA	000174
7						
8						
9						
10						
11						
12						
13						
14						
15	HYDRAULIC-A/B BOOSTER	8LV-90-10-289-F BOOSTER HYDRAULIC PUMP/SEAL	PAR 87-00000-1	0071-01 WTR 840700	NO VICKERS YES AA-00004-R-BA	000460
16						
17						
18	HYDRAULIC-A/B BOOSTER	00A0101.5 HYDRAULIC PUMP	UTP-PBT 87-00000-1	040814	CONVAIR YES VICKERS NO AA-00004-R-BA	
19						
20						

CORRECTIVE ACTION-SEPT 141-3 TO PERFORM REPEAT ON TWO (2) ADDITIONAL UNITS FROM LOT 13, TO DETERMINE LOT ACCEPTABILITY  
177 AND PROVIDE COMPARISON DATE.

FAILURE MODE-OUT OF SPECIFICATION. 8/N 400-0430. PEAK TRANSIENT PRESSURES WERE 4100 TO 4800 PSIG, ALLOWABLE IS 4000  
PSIG. NO. PUMP TO FULL FLOW TIME IS 0.157 SECONDS, ALLOWABLE TIME IS 0.08 SECONDS.

CORRECTIVE ACTION-SUBMIT ECP 7089 TO REVISE TEST REQUIREMENTS TO PRACTICAL LEVELS.

FAILURE MODE-LEAK-EXTERNAL-CONTINUOUS OIL SEEPAGE WAS OBSERVED DURING CHECKOUT. CAUSED BY DEFECTIVE SEAL AT PUMP  
ANNE PRESSURE SENSING PORT.

CORRECTIVE ACTION-VENDOR REVIEWED STOCK OF O-RINGS AND INFORMED THEIR PERSONNEL OF CORRECT SEAL INSTALLATION PROCED  
URES.

FAILURE MODE-LEAK-EXTERNAL. PUMP WAS REPORTED LEAKING AFTER HOT FIRING TEST. CASE WAS OVERPRESSURIZED CAUSING DAMAGE  
E TO CASE COVER SEAL.

CORRECTIVE ACTION-NO CONNECTIVE ACTION RECOMMENDED SINCE DAMAGE OCCURRED DUE TO INADVERTENT OVERPRESSURIZATION OF T  
HE PUMP.

FAILURE MODE-LEAK-INTERNAL. 8/N 800-0450 FAILED TO MEET CASE DRAIN LEAKAGE REQUIREMENTS OF 0.0 GPM DURING PBT-1AT.  
THIS UNIT ALSO FAILED TO MEET PEAK TRANSIENT PRESSURE REQUIREMENTS. REFER TO PPR-4201.

SYSTEM EFFECT-NONE.

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CONVAIR DIVISION

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DIFFICULTIES REVIEW-HYDRAULIC SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-BOOSTER HYDRAULIC FILL AND BLEED PERFORMED.						
HYDRAULIC-A/B BOOSTER	PTA8887/P8-WO-01-0AC8	COMPOSITE-PRO/DPL	1310 030713	308	NO NO	
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. TEST WAS RUN WITHOUT BOOSTER HYDRAULICS BECAUSE BOOSTER MPU COULD NOT BE OPERATED REMOTELY. THIS WAS NOTED DURING AUTOPILOT FINAL CHECKS.						
SYSTEM EFFECT-OPERATION DOES NOT START.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-BOOSTER MPU HAND VALVE, MICROSWITCHES V3 AND V1 ADJUSTED TO MAKE WIPER CONTACT.						
HYDRAULIC-A/B BOOSTER	60C/8KPA3-048/01-401-00-39	FLIGHT	300 030701	8-1 -32.9	YES NO	
FAILURE MODE-LEAK. B1 HYDRAULIC ACCUMULATOR PRESSURE EXHIBITED NO PRESSURE DIFFERENCE DURING THE OIL EVACUATION ACB WENCE.						
SYSTEM EFFECT-POSSIBLE CONTAMINATION. ALTHOUGH THE FAILURE MODE INDICATES THE POSSIBILITY OF AIR IN THE BOOSTER HYDRAULIC SYSTEM, SYSTEM PERFORMANCE WAS SATISFACTORY.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE. THE POSSIBILITY OF CONTAMINATION WAS NOT CONFIRMED BY ANY OTHER TELEMETRY DATA.						
HYDRAULIC-A/B BOOSTER	60C/8KPA3-039/82-401-00-177	FLIGHT	1770 030803	8-2 8.3	NO NO	
FAILURE MODE-OUT OF TOLERANCE. BOOSTER HYD ACCUM. PRESS MEASUR. H33P AND HYD. PUMP OUTLET PRESS. MEASUR H33P INDICATED AN INITIAL NORMAL PRESS. RISE BUT TO A LOWER (3190 PSIA) THAN NORMAL (3300 PSIA) PEAK AT 8.3 SEC. THE PRESS. THEN DECAYED TO 2780 PSIA DURING NEXT 1.3 SEC. SPECIFIC CAUSE UNKNOWN BUT SYMPTOMATIC OF UNUSUALLY HEAVY DEMAND ON SYSTEM.						
SYSTEM EFFECT-OPERATION TOO LOW. BOOSTER HYDRAULIC PRESS. LOWER THAN NORMAL FOR A TIME PERIOD OF -8.3 SEC TO 1.3 SEC. NO ADVERSE EFFECT NOTED ON SYSTEM PERFORMANCE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
HYDRAULIC-A/B BOOSTER	69/C22M93-015-8A1047-/L4-7MD-01-71	COMPOSITE-PRO/DPL	7107 030410	8-4	YES NO	

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GENERAL DYNAMICS  
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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-M1-A/B	FT44323/P1-203-00-9 B1 PURGE CHECK VALVE	PRP	90 581087	11/ETR	YES NO		891804
FAILURE MODE-FAIL DURING OPERATION. A B1 THRUST CHAMBER FUEL INJECTION PURGE CHECK VALVE DID NOT SEAT, THUS ALLOWING A FUEL LEAK TO SPRAY INTO THE THRUST SECTION DURING ENGINE OPERATION. FIRE STARTED IMMEDIATELY AND LASTED SEVERAL MINUTES AFTER CUTOFF.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-FIRE.							
CORRECTIVE ACTION-REPLACE VALVE.							
PROPULSION-M1-A/B BOOSTER	FT45028/P2-304-00-08 B66 LOX VALVE	COUNTDOWN	8C 590715	12/ETR 0	YES NO		890381
FAILURE MODE-OUT OF TOLERANCE. A REDLINE CUTOFF OCCURRED DUE TO THE B66 LOX VALVE INLET PRESSURE BEING ABOVE REDLINE DURING VERNIER IGNITION PHASE.							
SYSTEM EFFECT-OPERATION TOO HIGH. B66 LOX VALVE INLET PRESSURE WAS ABOVE REDLINE DURING VERNIER IGNITION PHASE. UPO IN THE REDLINE CALL OUT THE TEST CONDUCTOR INITIATED A CUTOFF.							
VEHICLE EFFECT-COUNTDOWN DELAYED RECYCLE TIME 70 MINUTES HOLD 130 MINUTES.							
CORRECTIVE ACTION-CHANGE B66 LOX INLET PRESSURE REDLINE TO HIGHER VALUE SINCE PREVIOUS DATA INDICATED THAT A SATISFACTORY ENGINE START COULD BE OBTAINED WITH THE HIGHER PRESSURES.							
PROPULSION-M1-A/B BOOSTER	FT45012/P2-301-00-08 REGULATOR	PRP	8C 590709	12/ETR -11	YES NO		893271
FAILURE MODE-OUT OF TOLERANCE. OBSERVER CUTOFF (THICE) BECAUSE P1517P, BOOSTER LOX START TANK PRESSURE WAS OVER REDLINE VALUE. IT WAS CONCLUDED THAT THE REGULATOR HAD LOCKED UP AFTER INLET PRESSURE APPLIED AT ENGINE START T-25 SEC. SIMILAR REGULATOR ACTION OCCURRED DURING P2-301-00-08.							
SYSTEM EFFECT-OPERATION TOO HIGH.							
VEHICLE EFFECT-COUNTDOWN DELAYED. 27 MIN. TOTAL HOLD AND 8 MIN. 35 SEC. TOTAL RECYCLE LOSS.							
CORRECTIVE ACTION-PRESSURIZED AND VENTED REGULATOR.							
PROPULSION-M1-A/B BOOSTER	2C-7-220/P2-301-00-07 ENGINE RELAY BOX, RELAY	FLIGHT	7C 590310	12/ETR 129	YES YES		
FAILURE MODE-FAIL DURING OPERATION. BOOSTER ENGINE SHUT DOWN PROMPTLY AT 129 SECONDS. POSSIBLE CAUSES CONSIDERED WERE: CHATTER OF THE BOOSTER CUTOFF RELAY NORMALLY OPEN CONTACTS, OUTPUT OF THE SUSTAINER-VERNIER CUTOFF NETWORK AND ELECTRICAL TRANSIENT INTRODUCED THROUGH ANY OF THE WIRING OR CONNECTORS ASSOCIATED WITH THE PRECEDING 2 ITEMS.							

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PHI OTM	VENDOR NAME VENDOR PART NO	
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY. SHUTDOWN OF THE BOOSTER ENGINES WAS FOLLOWED BY SHUTDOWN OF THE SUSTAINING AND VERNIER ENGINES. CAUSE OF SUSTAINER SHUTDOWN WAS NOT DETERMINED. VERNIER SHUTDOWN RESULTED FROM PROPELLANT DEPLETION IN THE START TANKS.						006660
	VEHICLE EFFECT-LOSS OF VEHICLE STABILITY. VEHICLE STABILITY WAS LOST WHEN BOOSTER SHUTDOWN OCCURRED AND WAS PARTIALLY REGAINED AFTER BOOSTER JETTISON. THERE WAS NO STABILITY DURING VERNIER-SOLO PHASE. MISSION FAILED.						
	CORRECTIVE ACTION-INSTALLED TIME DELAY R-C CIRCUIT IN ENGINE RELAY BOX TO PREVENT INADVERTENT CUTOFF BY SPURIOUS TRANSIENTS IN CUTOFF CIRCUITRY.						
PROPULSION-M1-A/B BOOSTER	ZC-7-209/ BOOSTER LOW REFERENCE REGULATOR	FLIGHT	11B 990204	11/ETR 0	NO NO	NOCKETDTYPE	009100
FAILURE MODE-OUT OF TOLERANCE. BOOSTER THRUST CHAMBER PRESSURE OUTPUTS WERE 9 AND 7 PERCENT HIGH FOR B1 AND B2 ENGINES. THIS RESULTED FROM A HIGH BOOSTER GAS GENERATOR REFERENCE REGULATOR SETTING ATTRIBUTED TO A MALFUNCTION OF NO 2 LANDLINE POWER SUPPLY AND ASSOCIATED VOLTAGE-METERING CIRCUITRY. REGULATOR WAS SET TO LANDLINE RECORDER WHICH HAD A LOW POWER SUPPLY RESULTING IN HIGH SETTING.							
SYSTEM EFFECT-OPERATION TOO HIGH.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE, SECONDARY FAILURE.							
PROPULSION-M1-A/B BOOSTER	B1-307-B3-02 THRUST CHAMBER	CAPTIVE	ZC 990106	B1/STC 0	YES NO	NOCKETDTYPE	008894
FAILURE MODE-ERRATIC OPERATION. BOTH FUEL INJECTION MANIFOLD PRESSURES (BOOSTER) INDICATED INCREASING OSCILLATIONS UP TO 150 PSI PEAK-TO-PEAK AT 400-600 CPS. THESE OSCILLATIONS WERE NOTED THROUGHOUT BOOSTER OPERATION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M1-A/B BOOSTER	B1-304-133-02 B2 TURBOPUMP BEARING TO TURBINE IN CEL SEAL	CAPTIVE	ZC 991212	B1/STC 91	YES YES	NOCKETDTYPE	009360
FAILURE MODE-OUT OF TOLERANCE. B2 TURBINE BEARING TEMPERATURE EXCEEDED REDLINE. POSSIBLY RESULTED FROM A FAILURE OF THE HOT GAS SEAL BETWEEN THE TURBINE WHEEL AND THE BEARING. OIL JET CHECKED OUT SATISFACTORY.							
SYSTEM EFFECT-HIGH TEMPERATURE ENVIRONMENT.							
VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF, OBSERVER CUTOFF.							
CORRECTIVE ACTION-REPLACED TURBINE ASSEMBLY.							

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-M41-A/B BOOSTER	SI-304-83-02 B2 TURBOPUMP BEARING	CAPTIVE	2C 301212	31/BYC 01	YES NO	ROCKETDOME	002339
FAILURE MODE-STRUCTURAL. B2 TURBINE BEARING TEMP. EXCEEDED REDLINE. POSSIBLY RESULTED FROM A DEFECTIVE BEARING.							
SYSTEM EFFECT-HIGH TEMPERATURE ENVIRONMENT.							
VEHICLE EFFECT-PRERATURE PROPULSION CUTOFF.							
CORRECTIVE ACTION-REPLACED TURBINE ASSEMBLY.							
PROPULSION-M41-A/B BOOSTER	2C-7-207/P1-208-00-9 PUMP-TURBO	FLIGHT	90 301117	11/ETR 0	YES NO		000340
FAILURE MODE-OUT OF TOLERANCE. BOOSTER ENGINE APPARENTLY OPERATED AT A FUEL RICH MIXTURE RATIO. BOOSTER POWER PACRA BE WAS NOT ACCEPTANCE TESTED WITH THE ENGINE AND NOMINAL FLOW CONDITIONS WERE NOT ESTABLISHED. C SERIES TURBOPUMPS WERE INSTALLED ON THIS MISSILE TO EXPEDITE FLIGHT CHECKOUT OF A FIX TO THE PUMPS.							
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. FUEL DEPLETION.							
VEHICLE EFFECT-PRERATURE SUSTAINER ENGINE SHUTDOWN. SHUTDOWN APPROXIMATELY 14 SECONDS EARLY.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M41-A/B BOOSTER	PTA323/P1-203-00-9 BOOSTER REGULATOR LINE	FWF	90 301027	11/ETR NO	YES NO		001772
FAILURE MODE-FAIL DURING OPERATION. AT CUTOFF THE BOOSTER ENGINE CONTROL REGULATOR OUTLET TRANSDUCER PLUMBING LINE SPLITT, RESULTING IN A CONTINUOUS HIGH FLOW OF HELIUM IN THE ENGINE COMPARTMENT.							
SYSTEM EFFECT-DEPLETION OF GAS SUPPLY. A CONTINUOUS HIGH FLOW OF HELIUM IN THE ENGINE COMPARTMENT DEPLETED HELIUM & SUPPLY.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPLACE LINE.							
PROPULSION-M41-A/B BOOSTER	2C-7-208/P9-208-00-09 TURBOPUMP BEARING	FLIGHT	90 300910	13/ETR 00.9	YES NO	NAA	
FAILURE MODE-FAILED DURING OPERATION. B1 ENGINE FAILED AS RESULT OF FAILURE OF B1 TURBOPUMP NUMBER 8 BEARING. LOW & B1 REFERENCE PRESSURE DECAY FOLLOWING FAILURE INDICATED PROBABLE PUNCTURE OF SENSE LINE BY PUMP FRAGMENTS SIMILAR TO B1A.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. FOLLOWING FAILURE OF THE B1 TURBOPUMP THE BOOSTER HYDRAULIC PRESSURE DECAYED RAPIDLY. LOW B1 REFERENCE PRESSURE DECAYED. BOOSTER ENGINE CHAMBER PRESSURES DECAYED WITH B1 DECAYING AHEAD OF B1A.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
82. COMPLETE BOOSTER SHUTDOWN FOLLOWED AS GAS GENERATOR OPERATION FELL OFF.						
VEHICLE EFFECT-PRIMATURE PROPULSION SHUTDOWN. DESTRUCTION AT 62.9 SECONDS FOLLOWING SHUTDOWN OF THE BOOSTER ENGINES DUE TO PITCH-UP OF VEHICLE.						
CORRECTIVE ACTION-PRESSURIZE GEAR-CASE BY PLACING RELIEF VALVE IN LUBE OIL DRAIN LINE, CHANGE NO. 3 BEARING FROM BA LL TO ROLLER TYPE AND ADD RETAINERS, REDESIGN THE NUTLL SHAFT.						
PROPULSION-NA1-A/B BOOSTER	28-7-079/22-219-CA-01 B1 THRUST CHAMBER	CAPTIVE	1B 540608	82/8YC	YES NO	YES ROCKETDYNE
FAILURE MODE-FAIL DURING OPERATION. FAILURE OF THE B2 THRUST CHAMBER RETAINING BAND WAS THE PROBABLE CAUSE OF RUPTU RING THE COOLANT TUBE (S) RESULTING IN A FUEL LEAK AND FIRE. FUEL LEAK STARTED PRIOR TO BECO AND THE FIRE STARTED . BECO PLUS 0.5 SECONDS.						
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. THE FUEL LEAK RESULTED IN A THRUST SECTION FIRE. THE FIRE CAUSED FAILURE OF THE SGC LOR PURGE LINE WHICH ADDED TO THE FIRE. AN EXPLOSION OCCURRED IN THE SUBTAINER ENGINE DURING SHUTDOWN.						
VEHICLE EFFECT-FIRE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-NA1-A/B BOOSTER	FT4188/P1-602-00-08 REGULATOR	PRF	1B 540608	11/ETR	YES NO	YES ROCKETDYNE
FAILURE MODE-OUT OF TOLERANCE. SGC LOR START TANK REGULATOR PRESSURE AND TANK PRESSURE INDICATED ABNORMALLY HIGH VA LUE FOLLOWING VERNIER START FOR 7 SECONDS.						
SYSTEM EFFECT-OPERATION TOO HIGH.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-NA1-A/B BOOSTER	EN-1028/TEST 14-305-A3 LUBE OIL TANK PRESSURE	CAPTIVE	540608	1-4/EDMA RDS 82	NO NO	NO
FAILURE MODE-OUT OF TOLERANCE. SUBTAINER OPERATION WAS TERMINATED PREMATURELY AFTER 101 SECONDS BY AN OBSERVER CUTO FF. AFTER 82 SECONDS FIRING, THE B1 LUBE OIL PRESSURE TRACE INDICATED A PRESSURE DROP FROM 770 TO 840 PSIG. THE TEST CONDUCTOR REQUESTED CONTINUED MONITORING. AT BOOSTER CUTOFF AS THE PRESSURE BEGAN A NORMAL DECAY, THE CHART C 'ERVE B. WARDRE OF THE SIMULATED STAGING, INITIATED CUTOFF.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-PRIMATURE PROPULSION SHUTDOWN. CUTOFF INITIATED BY CHART OBSERVER OF B1 LUBE OIL PRESSURE AS PRESSUR E BEGAN A NORMAL DECREASE DUE TO SIMULATED STAGING WHICH HE WAS NOT AWARE HAD OCCURRED.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PSI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-UNKNOWN.							093005
PROPULSION-M1-A/B BOOSTER	2C-7-097/P2-104-00-18 BOOSTER LOX REFERENCE REGULATOR	FLIGHT	18A 840603	12/ETR -11	YES NO	ROCKETDME NO R/D	090680
FAILURE MODE-OUT OF TOLERANCE. LOX REGULATOR REFERENCE PRESSURE WAS SET APPROXIMATELY 10 PSI LOW DUE TO USE OF A ME THE CASE WHICH WAS OUT OF CALIBRATION.							
SYSTEM EFFECT-OPERATION TOO LOW. BOOSTER GAS GENERATOR PERFORMANCE WAS LOW AND CONSEQUENTLY BOOSTER ENGINE PERFORMA NCE WAS LOWER THAN EXPECTED.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M1-A/B BOOSTER	FT4838/P2-101-00-18 FWF	18A 840418	12/ETR NO	NO			093321
FAILURE MODE-CONTAMINATION. A SILICA GEL DESICCANT BAG WAS LEFT IN THE BOOSTER ENGINE FUEL SYSTEM DUCTING WHICH BAD LY CONTAMINATED THE BE CHAMBER AND PROPELLANT FEED LINES.							
SYSTEM EFFECT-CONTAMINATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPLACED BOOSTER 2 ENGINE.							
PROPULSION-M1-A/B BOOSTER	2B-7-079/11-203-C1-07 B1 LUBE OIL LINE	CAPTIVE	7B 840406	1-1/EDNA RDS 61.78	NO NO		093136
FAILURE MODE-STRUCTURAL. B1 LUBE OIL PRESSURE LINE FAILED DUE TO THRUST SECTION FIRE.							
SYSTEM EFFECT-OPERATION TOO LOW. THE LUBE OIL PRESSURE DROPPED BELOW REDLINE LIMITS.							
VEHICLE EFFECT-PRIMATURE PROPULSION CUTOFF. OBSERVED CUTOFF WHEN REDLINE LIMIT WAS VIOLATED.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M1-A/B BOOSTER	2C-7-098/P4-108-00-13 PUMP-TURBO/BOOSTER NO. 1	FLIGHT	13A 840405	14/ETR 105	YES NO	ROCKETDME	
FAILURE MODE-FAIL DURING OPERATION-THE B1 TURBOPUMP FAILED AT 105.34 SECONDS PROBABLY BECAUSE OF A BEARING FAILURE IN THE GEAR BOX.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY-THE FAILURE OF THE B1 TURBOPUMP RESULTED IN PREMATURE SHUTDOWN OF THE BOO STER ENGINE.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
	VEHICLE EFFECT-PREMATURE PROPULSION SHUTDOWN-COMPLETE POWER SHUTDOWN OCCURRED APPROXIMATELY 22 SECONDS PREMATURELY AS A RESULT OF THE FAILURE. THE BOOSTER GAS GENERATOR SHUTDOWN BECAUSE IT IS FED FROM THE B1 PUMP THIS CAUSED SHUTDOWN OF THE B2 ENGINE AND THE VERNIERS WHICH ARE ALSO FED FROM THE B2 PUMP.					
	CORRECTIVE ACTION-FOLLOWING THE B2 FAILURE, TURBOPUMP BEARING 3.4.1, AND 8 WERE REDESIGNED. THE BUTT-TOOTH GEARS, 7 WE PLAT GASKET AND SEAL ON ACCESSORY DRIVE PAD, AND THE GULL SHAFT WERE REPLACED WITH LATER DESIGN. GEAR CASE PRESSURIZATION KIT, NON LEAKING, THERMOCOUPLES AND SKINNER SEAL TO TURBINE EXHAUST MANIFOLD WERE INSTALLED. THE 8 NUTS WERE REMOVED FROM OIL PRESSURE PORTS ON THE TURBOPUMP.					
PROPULSION-M1-A/B BOOSTER	PTA2710/P4-101-00-13 VALVE-PROPELLANT-BOOSTER FUEL	PRP	15A 500317	14/ETR	YES NO	
	FAILURE MODE-LEAK-EXTERNAL. FUEL LEAKS WERE DISCOVERED IN BOTH BOOSTER ENGINE FUEL VALVES.					
	SYSTEM EFFECT-NONE.					
	VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED.					
	CORRECTIVE ACTION-REPLACED FUEL VALVES.					
PROPULSION-M1-A/B BOOSTER	EN085/1A-108-87-14 B2 LOX PUMP CASING BOLT	CAPTIVE	14A 500222	14/ETR 09 48.5	YES NO	
	FAILURE MODE-LEAK-EXTERNAL. POST-TEST HARDWARE INSPECTION REVEALED A MISSING BOLT AT THE B2 LOX PUMP CASING.					
	SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT. B1 PRESSURE TRANSDUCERS WERE ADVERSELY AFFECTED BY EXTREMELY COLD TEMPERATURES AS A RESULT OF BEING SPRAYED BY LEAKING LOX.					
	VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. BOOSTER AND VERNIER ENGINE OPERATION WAS TERMINATED PREMATURELY AT 48.5 SECONDS BY OBSERVER CUTOFF WHEN VISUAL OBSERVATION OF CHARTS INDICATED AN ERRONEOUS DROP IN B1 PRESSURES. THE LOX LEAK ALSO PROVE THE TAN ACTUATOR AND FEEDBACK TRANSDUCER CAUSING THE B2 CHAMBER TO GO HARD OVER IN TAN AT ABOUT 31 SECONDS.					
	CORRECTIVE ACTION-SYSTEM REPAIRED.					
PROPULSION-M1-A/B BOOSTER	EC-7-093/P4-102-00-13 BEARING LUBE JET INSTRUMENTATION 8 OAS CAP-TURBO PUMP	FLIGHT	15A 500207	14/ETR 10.54	YES NO	
	FAILURE MODE-STRUCTURAL. AT 10.54 SECONDS OF FLIGHT THE B1 LUBE OIL INJECTION MANIFOLD PRESSURE DROPPED SHARPLY FROM 670 PSIA TO 460 PSIA AND REMAINED AT THIS LEVEL UNTIL SHORTLY BEFORE ENGINE SHUTDOWN. THIS SAME SITUATION OCCURRED DURING THE PRP ON THIS VEHICLE AND IS ATTRIBUTED TO LOSS OF THE CAP OVER AN UNUSED NO 2 BEARING LUBE JET INSTRUMENTATION BOSS.					
	SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. AT 109.4 SECONDS B1 LUBE OIL INJECTION MANIFOLD PRESSURE ROSE FROM 460 TO 640 PSIA THEN DECAYED TO 300 PSIA AT ENGINE SHUTDOWN. SINCE THE B2 PUMP INDICATED A RAPID SHUTDOWN IT IS FELT THAT THE NO. 5 BEARING WAS FAILED WITH RESULTANT GEARCASE DISINTEGRATION AND FLYING DEBRIS CAUSED BY MISDESIGN AND LACK OF					

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF TIM	SI DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
P LUBE OIL.							093500
VEHICLE EFFECT-NONE. ENGINE SHUTDOWN HAD BEEN INITIATED.							
CORRECTIVE ACTION-ALL UNUSED INSTRUMENTATION FITTINGS ON THE TURBOPUMP LUBE OIL SYSTEM WILL BE SAFETY WIRED.							
PROPULSION-MA1-A/B BOOSTER	EC-7-093/P4-102-00-13 NO. 3 TURBO PUMP BEARING	FLIGHT	13A 500207	14/ETR 117.8	YES NO	YES ROCKETDYNE	093502
FAILURE MODE-FAIL DURING OPERATION. B2 PUMP SHUTDOWN FASTER THAN NORMAL AT 117.8 SECONDS BECAUSE OF A FAILURE OF THE NO. 3 TURBOPUMP BEARING.							
SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. RESULTED IN FAILURE OF TURBINE SHAFT AND DISINTEGRATION OF THE GEAR BOX							
VEHICLE EFFECT-NONE. ENGINE SHUTDOWN HAD BEEN INITIATED.							
CORRECTIVE ACTION-PRESSURIZE GEAR CASE BY PLACING A RELIEF VALVE IN THE LUBE OIL DRAIN LINE, CHANGE NO. 3 BALL BEARING TO ROLL BEARING AND ADD RETAINERS, REDESIGN GULL SHAFT.							
PROPULSION-MA1-A/B BOOSTER	FTAE242/P4-101-00-13 TURBO-PUMP BOSS	PRF	13A 540131	14/ETR PLUS 20	YES NO	YES ROCKETDYNE	093536
FAILURE MODE-LEAK-EXTERNAL. LUBE OIL LEAKAGE OCCURRED AT A UNUSED INSTRUMENTATION BOSS (NO. 2 BEARING TEMPERATURE) ON THE NO. 3 BOOSTER TURBOPUMP. TEST DATA INDICATED THE BOSS BECAME UNCAPPED AT APPROXIMATELY PLUS 20 SECONDS.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE CAP WAS REPLACED AND NO FURTHER LEAKAGE WAS EVIDENT. THE SYSTEM WAS PRESSURIZED TO 300PSI TO DETERMINE THAT THE CAPS REMAINED IN PLACE.							
PROPULSION-MA1-A/B BOOSTER	FTAE247/P2-106-00-10 B1 MAIN FUEL VALVE.	COUNTDOWN	10A 560107	12/ETR -6000	YES NO	YES ROCKETDYNE	093710
FAILURE MODE-LEAKAGE-EXTERNAL. FUEL LEAK AROUND LIP SEAL OF NO. 2 BOOSTER FUEL VALVE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COUNTDOWN ABORTED AND RECHECKED. TWO MINUTE HOLD AND THEN TEST ABORTED.							
CORRECTIVE ACTION-REPLACE B1 MAIN FUEL VALVE.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-WA1-A/B BOOSTER	PTA2427/PE-104-00-10 B1 MAIN FUEL VALVE.	COUNTDOWN	10A 571210	12/ETR -12000	YES NO	YES ROCKETDYNE	097402
FAILURE MODE-LEAK-EXTERNAL. B1 MAIN FUEL VALVE WAS LEAKING AROUND THE SHAFT AND GATE SEALS.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. 90 MINUTES OF HOLD TIME. AT LEAST 12 MINUTES OF THE HOLD WAS SHARED WITH AN AUTOPILOT PROBLEM. THE TEST WAS THEN ABORTED DUE TO BOTH PROBLEMS.							
CORRECTIVE ACTION-REPLACE VALVE.							
PROPULSION-WA1-A/B BOOSTER	PTA2339/PE-103-00-10 THRUST CHAMBER	FRF	10A 571210	12/ETR	YES NO	YES ROCKETDYNE	093345
FAILURE MODE-ERRATIC OPERATION. IT WAS BELIEVED THAT ICE OR BLUSH FORMED IN THE B1 FUEL CHAMBER TUBING BEFORE IGNITION, RESULTING IN RESTRICTED FUEL FLOW TO THE CHAMBER AND CAUSING ROUGH COMBUSTION DURING TRANSITION.							
SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. SPLITS IN THE FUEL CHAMBER TUBING ABOVE THE THROAT NECESSITATED REPLACE MENT OF B1 ENGINE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPLACED B1 ENGINE.							
PROPULSION-WA1-A/B BOOSTER	EN-779/3-1, 103-A3-09 B66 IGNITER	CAPTIVE	9A 571203	8-1/2AYC 0	YES NO		098635
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. PREMATURE CUTOFF BY BOOSTER IGNITION STAGE TIMER AFTER 5.12 SECOND S OF VERMIER ENGINE OPERATION WHEN B66 IGNITER LINKS FAILED TO BREAK.							
SYSTEM EFFECT-OPERATION DOES NOT START.							
VEHICLE EFFECT-PRMATURE PROPULSION CUTOFF.							
CORRECTIVE ACTION-REPLACE IGNITER.							
PROPULSION-WA1-A/B BOOSTER	EN-7631A, 116-EP3-02A LOW LIQUID REGULATOR	CAPTIVE	2A 571031	1A/EDMAR D9	YES NO	YES ROCKETDYNE	
FAILURE MODE-OUT OF EXPECTED TEST VALVE. THRUST LOWER THAN NOMINAL. SEE EN-346/1A-104-A-02A.							
SYSTEM EFFECT-OPERATION TOO LOW. APPRECIABLY LOWER THAN NOMINAL.							
VEHICLE EFFECT-NONE.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-UNKNOWN.							000310
PROPULSION-MA1-A/B BOOSTER	EN-8861A/113-D8-02 BOOSTER ENGINE	CAPTIVE	2A 971008	1A/EDMA D8	YES NO	ROCKETDYNE	000382
FAILURE MODE-OUT OF EXPECTED TEST VALVE. BOOSTER THRUST WAS BELOW NOMINAL. TOTAL THRUST WAS 237,000 LBS WHEN 270,000 LBS WAS EXPECTED. 86% MIXTURE RATIO WAS 0.290 O/F WHEN NOMINAL IS 0.347 O/F. PROBLEM APPEARS TO CORRELATE WITH INCORPORATION OF SHROUDED BLADE TYPE TURBINES AFTER TEST 1A.103.							
SYSTEM EFFECT-OPERATION TOO LOW.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE APPARENT. RECOMMENDED ACTION WAS TO INCREASE LOX REGULATOR REFERENCE PRESSURE TO RANGE OF 50 G TO 325 PSIG WITH USE OF SHROUDED BLADE TYPE TURBINES.							
PROPULSION-MA1-A/B BOOSTER							000319
EN-886/1A. 113-08-02 BOOSTER THRUST CHAMBER		CAPTIVE	2A 971008	1A/EDMA D8	YES NO	ROCKETDYNE	
FAILURE MODE-STRUCTURAL-POST TEST INSPECTION REVEALED SEVERAL PIN HOLES IN THE B2 THRUST CHAMBER.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN. HOLES WERE REPAIRED.							
PROPULSION-MA1-A/B BOOSTER							000380
EN-880/109-SP2-03 THRUST CHAMBER FUEL TUBES		CAPTIVE	5A 971003	1-1/EDMA R03	YES NO		
FAILURE MODE-LEAK-EXTERNAL. POST TEST INSPECTION OF THE B2 THRUST CHAMBER REVEALED EXCESSIVE INTERNAL LEAKAGE IN THE E THRUST SECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-B2 THRUST CHAMBER REPLACED.							
PROPULSION-MA1-A/B BOOSTER							000382
EN-880/109-SP2-03 B1 TURBINE TO EXHAUST DUCT FLANGE		CAPTIVE	5A 971003	1-1/EDMA R03	YES NO		
FAILURE MODE-LEAK-EXTERNAL. HIGH EXHAUST LOCKHEART TEMPERATURES WERE THE RESULT OF A LARGE HOT GAS LEAK AT THE NAT AND SURFACE BETWEEN B1 TURBINE AND THE 5 LINE EXHAUST DUCT.							
SYSTEM EFFECT-NON-ENGINE COMPARTMENT. TEMPERATURES WERE NOTED AS A RESULT OF THE LARGE GAS LEAK. ALSO, POST TEST IN							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR P.L.T NO
VESTIGATION REVEALED EVIDENCE OF FIRE IN THE THRUST SECTION.						
VEHICLE EFFECT-FIRE.						
CORRECTIVE ACTION-REPLACEMENT OF SEAL AT MATING SURFACE BETWEEN B1 TURBINE AND TURBINE EXHAUST DUCT.						
PROPULSION-NA1-A/B BOOSTER	DN-660/106-SPE-03 WIRE	CAPTIVE	5A 571002	1-1/EDMA YES RDS NO 8.53		
FAILURE MODE-ERRATIC OPERATION. A SHORT OCCURRED AS A RESULT OF A BROKEN JUMPER WIRE AROUND A SWITCH INSTALLED BETWEEN THE TANK PRESSURIZING SOLENOID AND CANNON PLUG FOR USE DURING SEQUENCE CHECKS. THE SHORTING RESULTED IN INTERMITTENT GROUNDING THAT ALLOWED DROPOUT OF THE LUBE OIL PRESSURIZING SOLENOID AND THE LUBE OIL TANK VENTED. THE B1 AND B2 LUBE OIL INJECTION MANIFOLD PRESSURES STARTED TO DECAY AT 6.4 SECONDS. PRESSURES CONTINUED TO DECAY UNTIL THEY DROPPED BELOW THE 300 PLUS OR MINUS 20 PSIG LOWER LIMIT.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. CUTOFF WAS INITIATED AS A RESULT OF LUBE OIL PRESSURE DROPPING BELOW THE 300 PLUS OR MINUS 20 PSIG LOWER LIMIT.						
VEHICLE EFFECT-PRMATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION-REPLACE BROKEN JUMPER WIRE.						
PROPULSION-NA1-A/B BOOSTER	DN-667/1A,1J1-D8-02 BOOSTER ENGINE	CAPTIVE	2A 570927	1-A/EDMA YES RDS NO		
FAILURE MODE-OUT OF TOLERANCE. THRUST CHAMBER PRESSURE WAS TOO LOW TO OBTAIN RATED THRUST. LOX AND FUEL FLOW WAS LOW COMPARED TO NOMINAL AND PUMP SPEEDS WERE APPROX. 250 RPM LOW AT 5700 RPM.						
SYSTEM EFFECT-OPERATION TOO LOW.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE APPARENT. RECOMMENDED ACTION WAS TO INCREASE LOX REGULATOR REFERENCE PRESSURE TO RANGE OF 50 TO 325 PSIG WITH USE OF SHROUDED BLADE TYPE TURBINES.						
PROPULSION-NA1-A/B BOOSTER	DN-667/1A,1J1-D8-02 IGNITER	CAPTIVE	2A 570928	1-A/EDMA YES RDS NO 8.17		
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME- AN IGNITER FAILED TO FIRE. FIRING OF BOTH IGNITERS IS REQUIRED TO COMPLETE THE START LADDER.						
SYSTEM EFFECT-OPERATION DOES NOT START-THE BOOSTER ENGINES DID NOT FIRE.						
VEHICLE EFFECT-PRMATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION-IGNITION CIRCUITRY WAS REQUIRED TO PROVIDE IGNITION IN CASE EITHER IGNITER FAILS.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRE DIP	VEHICLE NAME PART NO
PROPULSION-NA1-A/B BOOSTER	DN-687/1-A-1109-04-02 IGNITER	CAPTIVE	2A 370929	1-A/EDNA RDS 9.03	YES NO	ROCKETDYNE
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME- NO. 2 IGNITER FAILED TO FIRE. FIRING OF BOTH IGNITERS IS REQUIRED TO COMPLETE THE START LADDER.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START-THE BOOSTER ENGINES DID NOT FIRE.</p> <p>VEHICLE EFFECT-PRMATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-IGNITION CIRCUITRY WAS REQUIRED TO PROVIDE IGNITION IN CASE EITHER IGNITER FAILS.</p>						
PROPULSION-NA1-A/B BOOSTER	EC-7-085-04/P4-102-00-04 BGA REGULATOR REFERENCE HELIUM LIN E-RIGID TUBING	FLIGHT	6A 370929	14/ETR 32.6	NO NO	ROCKETDYNE
<p>FAILURE MODE-FAIL DURING OPERATION. AS A RESULT OF THE 17.5 CPS OSCILLATIONS CREATED BY THE FLIGHT CONTROL SYSTEM A NO/OR THE HIGH ENGINE COMPARTMENT TEMPERATURES, THE BGA REGULATOR REFERENCE ALUMINUM HELIUM LINE RUPTURED.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. LOSS OF HELIUM LINE CAUSED STARVATION OF LOX TO THE BGC WITH RESULTANT C MEINE FLAME OUT.</p> <p>VEHICLE EFFECT-PRMATURE BOOSTER ENGINE SHUTDOWN. THE VEHICLE WAS SUBSEQUENTLY DESTROYED BY RANGE SAFETY.</p> <p>CORRECTIVE ACTION-04 REG REFERENCE ALUMINUM LINE CHANGED TO STAINLESS STEEL.</p>						
PROPULSION-NA1-A/B BOOSTER	PTA120/P4-100-01-04 GAS GENERATOR BLADE VALVE	COMPOSITE-B FACT	6A 370919	14/ETR	YES NO	ROCKETDYNE
<p>FAILURE MODE-OUT OF SPECIFICATION. BOOSTER GAS GENERATOR BLADE VALVE OPENING TIMES WERE 1.38 AND 0.37 SECONDS ON 2 RUNS. NOMINAL LIMITS WERE 0.40 TO 0.80 SEC.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE. THE OPERATING TIMES WERE ACCEPTABLE TO ENGINEERING.</p>						
PROPULSION-NA1-A/B BOOSTER	DN-6341-1-109-04-1 IGNITION DETECTOR LINKS	CAPTIVE	2A 370912	1-1/EDNA RDS 9.42	YES NO	
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. POST TEST INVESTIGATION REVEALED THAT THE IGNITION DETECTOR WIRES WERE BROKEN. THE DETECTOR LINKS WERE CRUSHED AND FOUND SHORTED.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. THE SHORTED DETECTOR LINK CAUSED THE IGNITION DETECTOR DELAY TIMER TO AC TIVATE AND CAUSED ENGINE SHUTDOWN.</p>						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
VEHICLE EFFECT-PREMIATURE PROPUSSION SHUTDOWN.						
CORRECTIVE ACTION-UNKNOWN.						
PROPUSSION-M1-A/B BOOSTER	A791-1.A3 B2 MAIN LOX VALVE	CAPTIVE	3A 570810	1-1/EDMA YES RDS NO	YES NO	
FAILURE MODE-EXTERNAL LEAK. POST-TEST INSPECTION REVEALED THAT THE B2 MAIN LOX VALVE WAS LEAKING AT 6 PSIG.						
SYSTEM EFFECT-NONE-OPERATION HAD ALREADY BEEN SECURED.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPUSSION-M1-A/B BOOSTER	EH-348/1A-104-03-02A LOX LIQUID REGULATOR	CAPTIVE	2A 570703	1A/EDMA YES RDS NO	YES NO	
FAILURE MODE-OUT OF TOLERANCE. PLANNED SETTING OF LOX LIQUID REGULATOR REDUCED FROM 570 PSIG FOR PREVIOUS TESTS TO 440 PSIG FOR THIS TEST. SEE EH-785-1A/150-9P3-02A.						
SYSTEM EFFECT-OPERATION TOO LOW. B1 THRUST 127K LBS. B2 THRUST 130K LBS AS COMPARED TO RATED THRUST OF 135K LBS. IN RUST CHAMBER PRESSURES WERE 504 PSIA FOR B1, 515 PSIA FOR B2 AS COMPARED TO NORMAL PRESSURE OF 530 PSIA. LOX FLOW MA 8 670 LBS/SEC AS COMPARED TO NOMINAL 760 LBS/SEC.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-SUBSEQUENT TEST INDICATED THAT A REGULATOR SETTING OF 500 TO 525 PSIG MAY BE NECESSARY TO PRODUCE THE NOMINAL RATED THRUST FROM BOOSTER ENGINES USING THE B-ROLOD BLADE TURBINES.						
PROPUSSION-M1-A/B BOOSTER	EH-514/111-07-03 B1 TURBO PUMP, BEARING	CAPTIVE	3A 570828	9-1/8VC NO RDS NO	NO NO	
FAILURE MODE-OUT OF TOLERANCE. A POST-RUN TURBOPUMP TORQUE CHECK REVEALED THAT THE B1 TURBOPUMP BREAKAWAY TORQUE AN D RUNNING TORQUE WERE EXCESSIVE. INSPECTION BY AN MA REPRESENTATIVE INDICATED IT WAS PROBABLY DUE TO A DEFECTIVE TU RINE SHAFT BEARING.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MA1-A/B BOOSTER	ZC-7-201/P4-103-00-04 GAS GENERATOR, LINE	FLIGHT	4A 570615	14/ETR 24.7	NO NO	
<p>FAILURE MODE-FAIL DURING OPERATION. REDUCED LOX FLOW TO THE B2 TURBOPUMP RESULTED IN B2 THRUST DECAY AND LOSS OF VE HICLE STABILITY. POSSIBLE CAUSES ARE HIGH ENGINE COMPARTMENT TEMPERATURES AND/OR VIBRATION, IMPARTED BY FLIGHT CONTR OL.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW. B2 THRUST WAS TOO LOW CREATING IMBALANCE.</p> <p>VEHICLE EFFECT-LOSS OF VEHICLE STABILITY. VEHICLE DESTROYED BY RANGE SAFETY.</p> <p>CORRECTIVE ACTION-NO CORRECTIVE ACTION TO PROPULSION SYSTEM.</p>						
PROPULSION-MA1-A/B BOOSTER	EH-433/106-0-4 TUBING	CAPTIVE	3A 570527	31/STC 56	YES NO	
<p>FAILURE MODE-STRUCTURAL. AT 58 SECONDS THE B2 FUEL VALVE OPEN CONTROL LINE RUPTURED AS THE RESULT OF AN ENGINE COMP ARMENT FIRE.</p> <p>SYSTEM EFFECT-OPERATION TOO HIGH. THE RUPTURE CAUSED THE B2 FUEL VALVE TO CLOSE PARTIALLY WHICH REDUCED THE FUEL FL OW FROM 543 POUNDS PER SECOND TO 315 POUNDS PER SECOND. THIS IN TURN INCREASED THE MIXTURE RATIO FROM 2.30 LOR TO FU EL TO 2.34.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MA1-A/B BOOSTER	EH-466/31-107-2 RELAY	CAPTIVE	3A 570522	31/STC 0	NO NO	
<p>FAILURE MODE-FAIL DURING OPERATION. THE BOOSTER IGNITION DELAY CUTOFF TIMER INITIATED CUTOFF BECAUSE THE TCC 16M771 ON COMPLETE LIGHT MAIN STAGE START RELAY (71 C) DID NOT RECEIVE A SIGNAL TO ENERGIZE.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY.</p> <p>VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MA1-A/B BOOSTER	EH-466/31-107-1 DETECTOR LINES WIRE CONNECTOR	CAPTIVE	3A 570521	31/STC 0	YES NO	
<p>FAILURE MODE-FAIL TO OPERATE. THE DETECTOR WIRE ACROSS THE BOTTOM OF THE BOOSTER THRUST CHAMBER APPARENTLY SHORTED AT THE CONNECTOR.</p> <p>SYSTEM EFFECT-IMPROPER DISCRETE SIGNAL. BOOSTER IGNITION WAS NOT DETECTED BY THE BREAKING OF THE DETECTOR LINK THEN</p>						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-M1-A/B BOOSTER	EH-419/103 TURBO PUMP-TRANSDUCER	CAPTIVE	3A 570318	SYCAMORE 40.13	YES NO	ROCKETDYNE	992087
<p>BY ALLOWING THE IGNITION DETECTOR DELAY TIMER TO ENGINE GENERATING CUTOFF.</p> <p>VEHICLE EFFECT-PRIMATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-REPLACE CONNECTOR.</p>							
PROPULSION-M1-A/B BOOSTER	EH-419/103 TURBO PUMP-TRANSDUCER	CAPTIVE	3A 570318	SYCAMORE 40.13	YES NO	ROCKETDYNE	994087
<p>FAILURE MODE-FAIL DURING OPERATION. THE B1 TURBOPUMP OVER SPEED TRIP ACTIVATED AT A SPEED OF 6100 RPM. IT SHOULD NOT HAVE ACTIVATED UNTIL 6350 TO 6475 RPM. ROCKETDYNE REPRESENTATIVE BELIEVES THE TRIP WAS ACTIVATED BY A LOCALIZED VIBRATION INDUCED BY THE HYDRAULIC PUMP.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. THE PROPULSION SYSTEM SHUT DOWN APPROXIMATELY 20 SECONDS BEFORE SCHEDULED SHUTDOWN.</p> <p>VEHICLE EFFECT-PRIMATURE BOOSTER ENGINE SHUTDOWN. THE TEST WAS TERMINATED 20 SECONDS EARLY.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>							
PROPULSION-M1-A/B BOOSTER	EH-451 14.133 B1 THRUST CHAMBER REGENERATIVE COOLING TUBES	CAPTIVE	570318	1-4/EDMA ROS 2.63	NO NO	ROCKETDYNE	998039
<p>FAILURE MODE-STRUCTURAL-POST TEST INSPECTION OF THE B1 THRUST CHAMBER REVEALED THAT TWELVE REGENERATIVE COOLING TUBES WERE SPLIT IN THE THROAT AREA. THESE RUPTURED TUBES COULD BE DUE TO THE CUMULATIVE RESULT OF AN IGNITION EXPLOSION WHICH HAD BEEN A CHARACTERISTIC OF THIS CHAMBER DURING STARTS ON PREVIOUS TESTS.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY-THE PROPULSION SYSTEM WAS CHARACTERIZED BY ROUGH COMBUSTION IN THE B1 ENGINE THAT EVENTUALLY CAUSED ENGINE SHUTDOWN BY THE RCC CUTOFF SYSTEM.</p> <p>VEHICLE EFFECT-PRIMATURE BOOSTER ENGINE SHUTDOWN-PRIMATURE ENGINE SHUTDOWN WAS CAUSED BY THE RCC CUTOFF NETWORK WHEN THE B1 THRUST CHAMBER ACCELEROMETER INDICATED 90 G AT 2.63 SECONDS.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>							
PROPULSION-M1-A/B BOOSTER	ZB-7-007 PART 2/14.124 LUBE OIL PRESSURE SWITCH	CAPTIVE	570418	1-4/EDMA ROS 0	YES NO	ROCKETDYNE	993079
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE LUBE OIL PRESSURE SWITCH DID NOT ACTUATE.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. BOOSTER LUBE OIL CUTOFF RESULTED FROM THE SWITCH MALFUNCTION.</p> <p>VEHICLE EFFECT-PRIMATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-REPLACE SWITCH.</p>							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PHI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-M1-A/B BOOSTER	EN-419/11.101 BOOSTER THRUST CHAMBER TUBES.	CAPTIVE	2A 870419	SYCAMORE	YES NO	ROCKETDYNE	094040
	FAILURE MODE-STRUCTURAL. POST TEST INVESTIGATION REVEALED 3 TUBE SEPARATIONS IN THE B1 THRUST CHAMBER.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-UNKNOWN. REPAIR.						
PROPULSION-M1-A/B BOOSTER	EN-395/11.101-1 MAIN FUEL VALVE	CAPTIVE	2A 870329	1A/EDMAR DS 0.11	YES NO	MJA	093291
	FAILURE MODE-OUT OF TOLERANCE. MAIN FUEL VALVE CLOSING TIMES WERE FASTER THAN EXPECTED. CLOSING TIMES WERE 0.09 SEC FOR B1 MFT, 0.20 SEC FOR B2 MFT. MJA SPEC WAS 0.35 TO 0.45 SEC.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-SUBSEQUENT TESTS INDICATED PROPER RESPONSE TIMES.						
PROPULSION-M1-A/B BOOSTER	EN-384/104-1 MAIN FUEL VALVES	CAPTIVE	3A 870321	2-1/3YC 14.00	NO NO	MJA-ROCKETDYNE	090813
	FAILURE MODE-OUT OF TOLERANCE. VALVE RESPONSE TO THE CLOSING SIGNAL WAS TOO SLOW. MAX RESPONSE TIME SPEC WAS 0.15 SEC. VALVEND. 1 INDICATED 0.30 SEC, VALVE NO. 2 INDICATED 0.27 SEC.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M1-A/B BOOSTER	ZB-7-007 PART 2/14,114-3 LUBE OIL PRESSURE SWITCH	CAPTIVE	370313	1-4/EDMAR RDS 0	YES NO	ROCKETDYNE	094093
	FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE LUBE OIL PRESSURE SWITCH DID NOT ACTUATE DUE TO A SWITCH MALFU ACTION.						
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY. BOOSTER LUBE OIL CUTOFF RESULTED FROM THE SWITCH MALFUNCTION.						
	VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF.						
	CORRECTIVE ACTION-REPLACE SWITCH.						

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## DIFFICULTIES REVIEW-PROLUSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP TIME	SITE DIP TIME	PRE OTH	VEHICLE NAME VEHICLE PART NO
PROLUSION-M1-A/B BOOSTER	DN-347/103-1 MAIN FUEL VALVES	CAPTIVE	3A 370210	31/3YC 4.01	YES NO	990397
FAILURE MODE-OUT OF TOLERANCE. THE TOTAL CLOSING TIME OF THE MAIN FUEL VALVES WERE 0.21 SECONDS AND 0.16 SECONDS RESPECTIVELY. THE SPECIFICATION STATES THE CLOSING TIME TO BE 0.10 TO 0.15 SECONDS.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROLUSION-M1-A/B BOOSTER	DN-347/103-1 THRUST CHAMBER	CAPTIVE	3A 370210	31/3YC 5.	YES NO	990390
FAILURE MODE-OUT OF TOLERANCE. STEADY STATE LOW FLOW WAS 227 LBS. PER SECOND INSTEAD OF 700 LBS PER SECOND AS EXPECTED.						
SYSTEM EFFECT-OPERATION TOO HIGH. THE LOW-FUEL MERTURE RATIO WAS 2.03 INSTEAD OF 2.25 PLUS OR MINUS 2 PCT.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROLUSION-M1-A/B BOOSTER	DN-347/103-1 THRUST CHAMBER	CAPTIVE	3A 370210	31/3YC 0.4	YES NO	990394
FAILURE MODE-OUT OF TOLERANCE. AN ABNORMAL PRESSURE SURGE OF APPROXIMATELY 100 PSI IN THE B1 THRUST CHAMBER AT PUMP START BETWEEN 0.4 AND 0.65 SECONDS.						
SYSTEM EFFECT-NONE. EFFECT SEEN ON FLIGHT CONTROL.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROLUSION-M1-A/B BOOSTER	DN-347/103-1 RELAY	CAPTIVE	3A 370210	31/3YC 1.26	NO NO	
FAILURE MODE-ABNORMAL OPERATION. THE LOW START TIME NOTED AT 1.26 SECONDS INSTEAD OF 2 SECONDS AS EXPECTED. THIS WAS CAUSED BY A FAULTY RELAY CLOSURE ON THE GROUND DUE TO EXCESSIVE VIBRATION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-THE RELAY BOX ON THE GROUND WAS INSTRUMENTED FOR THE NEXT TEST.						
PROPULSION-M1-A/B BOOSTER	EN-347/100-1 BE TURBOPUMP	CAPTIVE	SA ST0810 3	3-1/3YC 3	NO NO	ROCKETDYNE
FAILURE MODE-OUT OF TOLERANCE. THE BE PUMP EXCEEDED 8000 RPM. THE OVERSPEED TRIP DID NOT ACTIVATE AT 8100 RPM AS IT SHOULD HAVE.						
SYSTEM EFFECT-OPERATION TOO HIGH.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-M1-A/B BOOSTER	ZB-7-007 PART 2-113-1 BE ENGINE TURBINE OVERSPEED TRIP	CAPTIVE	ST0802	1-4/EDMA NO3	YES NO	ROCKETDYNE
FAILURE MODE-ERRATIC OPERATION-FAULTY BE TURBINE OVERSPEED SWITCH.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY-ERRATIC BE TURBINE OVERSPEED SWITCH CAUSED PREMATURE PROPULSION SHUTDOWN.						
VEHICLE EFFECT-PREMATURE BOOSTER ENGINE CUTOFF.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M1-A/B BOOSTER	ZB-7-007 PART 2-113-1 MAIN LOZ VALVE	CAPTIVE	SA1220	1-4/EDMA NO3	YES NO	ROCKETDYNE
FAILURE MODE-FAILED TO OPERATE AT PRESCRIBED TIME. THE MAIN LOZ VALVE WAS PROVEN CLOSED.						
SYSTEM EFFECT-OPERATION DOES NOT START-THE PROVEN MAIN LOZ VALVE FAILURE TO OPEN RESULTED IN NOT ACHIEVING IGNITION OF THIS ENGINE.						
VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M1-A/B BOOSTER	ZB-7-007/100-1 MAIN LOZ VALVE	CAPTIVE	SA NO3021	31/3YC	YES NO	ROCKETDYNE
FAILURE MODE-OUT OF SPECIFICATION. SA SEQUENCE RECORDERS INDICATE DISCREPANCIES IN THE MAIN LOZ VALVE CLOSING SEQUE.						
SYSTEM EFFECT-NONE.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PHI OTH	VENDOR NAME VENDOR PART NO
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-HAI-A/B BOOSTER	ZB-7-037/102-1 BOOSTER CONTROL PNEUMATIC REGULATOR	CAPTIVE	1A 961221	81/3YC	YES NO	YES ROCKETDYNE
FAILURE MODE-FAIL TO CEASE OPERATION AT PRESCRIBED TIME. BOOSTER CONTROL PNEUMATIC REGULATOR PRESSURE, AFTER PEAKING TO 60 PSI AT SHUTDOWN, DECREASED SLOWLY BACK TO ITS PRE-TEST SETTING AT 19 SECONDS. THIS DECREASE WOULD NORMALLY TAKE PLACE WITHIN ONE SECOND AFTER SHUTDOWN.						
SYSTEM EFFECT-OPERATION TOO LONG.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-HAI-A/B BOOSTER	ZB-7-037/102-1 LOX LIQUID REGULATOR VENT VALVE	CAPTIVE	1A 961221	81/3YC	YES NO	YES ROCKETDYNE
FAILURE MODE-FAIL TO OPERATE. THE LOX REGULATOR VENT VALVE, WHICH WAS TO HAVE VENTED PNEUMATIC PRESSURE AT SHUTDOWN, FAILED TO DO SO.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-HAI-A/B BOOSTER	ZB-7-037/102-1 GAS GENERATOR BLADE VALVE.	CAPTIVE	1A 961221	81/3YC	YES NO	YES ROCKETDYNE
FAILURE MODE-OUT OF SPECIFICATION. EA SENSORS RECORDERS INDICATE DISCREPANCIES IN THE GAS GENERATOR BLADE VALVE CLOSURE SEQUENCE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-HAI-A/B BOOSTER	ZC-7-034/14,102-33 GAS LOX SUPPLY LINE	CAPTIVE	340022	1-4/FDMA NO	NO NO	NO ROCKETDYNE
FAILURE MODE-OUT OF EXPECTED TEST VALUE. A REVERSED PRESSURE GRADIENT IN THE LOX FEED LINE IS INDICATED SHORTLY BEFORE CUTOFF WHEN THE GAS GENERATOR LOX INJECTION PRESSURE WAS 60 PSI AND THE LOX VALVE INLET PRESSURE WAS 33 PSI. THE						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
094097						
CONDITION IS ATTRIBUTED TO ABNORMAL OPERATION OF THE GROUND FUEL START TANK.						
SYSTEM EFFECT-CONTAMINATION. WITH REVERSE FLOW, FUEL WAS ALLOWED TO FLOW INTO THE GAS GENERATOR LOW FEED LINE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-MODIFY THE GROUND FUEL START TANK WIRING TO PREVENT VENTING OF THIS START TANK.						
098150						
PROPULSION-WAI-A/B BOOSTER	ZC-7-030/14.10E-38 GROUND FUEL START TANK	CAPTIVE	960822	1-4/EDMA ROS 1.96	YES NO	YES ROCKETDYNE
FAILURE MODE-OUT OF EXPECTED TEST VALUE. INADEQUATE FUEL FLOW WAS SUPPLIED FROM THE GROUND FUEL START TANK DUE TO P ROCEDURAL ERROR. THE GFT WAS VENTED WHEN NO VENTING WAS PLANNED.						
SYSTEM EFFECT-OPERATION TOO LOW. LOW FUEL FLOW RESULTED IN HOT BOOTSTRAPPING THE FUEL SIDE, THEREBY CONTINUALLY DECR EASING PUMP SPEED AND PERFORMANCE.						
VEHICLE EFFECT-ORBITAL PROPULSION CUTOFF.						
CORRECTIVE ACTION-WIRE GROUND FUEL START TANK TO TEST DIRECTIVE CONFIGURATION.						
094449						
PROPULSION-WAI-A/B BOOSTER	ZC-7-030/14.10E-18 IGNITER DETECTOR LINKS	CAPTIVE	960820	1-4/EDMA ROS 0	YES NO	YES ROCKETDYNE
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE IGNITION DETECTOR LINKS FAILED TO BREAK WHEN INADEQUATE IGNITE R FUEL FLOW WAS SUPPLIED FROM THE GROUND FUEL START TANK. THIS WAS A LOW-WATER BLOOMOM TEST.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. FAILURE OF THE IGNITION DETECTOR LINKS TO BREAK RESULTED IN IGNITION DET ECTOR DELAY TIMER CUTOFF.						
VEHICLE EFFECT-ORBITAL PROPULSION CUTOFF.						
CORRECTIVE ACTION-UNKNOWN.						
093292						
PROPULSION-WAI-A/B SUBSTAINER	PTA0083/74-402-00-10 VALVE-PROPELLANT-84% BLADE VALVE	FRY	100	14/ETR	YES NO	YES ROCKETDYNE
FAILURE MODE-LEAKAGE-EXTERNAL. A SLIGHT HYDRAULIC LEAK WAS FOUND AT THE CLOSING SIDE OF THE SUBSTAINER GAS GENERATOR BLADE VALVE DURING THE POST TEST INSPECTION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-STOPPED LEAK.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE OF	SITE TIME OF	PRI OTM	VENDOR NAME VENDOR PART NO
PROPULSION-MA1-A/B SUSTAINER	2C-7-223/PE-303-00-11 HEADSUPPRESSIONVALVE,SERVO	FLIGHT	11C 990284	12/ETH 0	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. OPERATION OF HEAD SUPPRESSION VALVE FAULTY CAUSING LESS LOX FLOW TO SUSTAINER ENGINE THAN EXPECTED. SUSPECTED INCORRECT SETTING OF HS SERVO CONTROL VALVE WHEN REPLACED BETWEEN PMF AND FLIGHT.</p> <p>LOX CONSUMPTION NOT CONSISTENT WITH PU VALVE OPERATION.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW. LOX FLOW TO SUSTAINER ENGINE LESS THAN EXPECTED RESULTING IN LOW SUSTAINER THRUST AND USE OF ALL BURNABLE FUEL BY SECO.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MA1-A/B SUSTAINER	PTABDAS/PE-301-00-11 CHECK VALVE	PMF	11C 990814	12/ETH NO	YES NO	
<p>FAILURE MODE-FAIL DURING OPERATION. ONE OF FOUR CHECK VALVES IN THE FUEL INJECTION PURGE SYSTEM FAILED, ALLOWING FUEL TO RELIEVE THROUGH VENT PORT OF FUEL INJECTOR PURGE BOLENOID INTO THRUST SECTION NEAR SUSTAINER CATALYST DUCTING, CAUSING A FIRE.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-FIRE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MA1-A/B SUSTAINER	MTD59-0230-A/1A-302 THRUST CHAMBER, TUBES	CAPTIVE	6C 990327	1A/EDWAR 03 8.9	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-ERRATIC OPERATION. UNUSUALLY HIGH VIBRATION LEVELS WERE EXPERIENCED BY THE SUSTAINER ENGINE. CAUSE OF THE HIGH FREQUENCY PRESSURE TRANSIENTS IS UNKNOWN.</p> <p>SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. POST TEST INSPECTION REVEALED A RUPTURE OF THE -51 STIFFENING BAND AND AN ADJACENT EXTERNAL FUEL COOLANT TUBE SPLIT IN THE SUSTAINER ENGINE. APPEARANCE OF SPLIT INDICATED RUPTURE UNDER PM FAILURE.</p> <p>VEHICLE EFFECT-FIRE. AT 29.5 SECONDS A MINOR EXPLOSION FOLLOWED BY A FUEL RICH FIRE OCCURRED IN THE ENGINE COMPARTMENT WITH A SEVERE EXPLOSION IN THE ENGINE COMPARTMENT AREA AT 43 SECONDS WHICH CULMINATED IN THE DESTRUCTION OF THE VEHICLE.</p> <p>CORRECTIVE ACTION-RECOMMENDATIONS FOR CORRECTIVE ACTION ARE PRESENTED IN SOURCE REPORT, PAGE 11.</p>						

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SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	OIF DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI 11/ETR	12/ETR	YES	NO	VENDOR NAME VENDOR PART NO
PROPULSION-M1-A/B SUSTAINER	ZC-7-218/PB-303-00-04	FLIGHT	4C 590127						893877
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. AFTER STAGING SUSTAINER THRUST WAS 7000 POUNDS BELOW NOMINAL WITH THE ERROR INCREASING TO 10,500 POUNDS AT 233 SECONDS. THIS WAS APPARENTLY DUE TO A LOW MIXTURE RATIO (1.9 TO 1.84) AND LOW FUEL FLOW RATES DUE TO THE POSITION OF THE SUSTAINER MAIN FUEL VALVE WHICH WERE CORRECTING FOR A FUEL RIOT CONDITION.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW. SUSTAINER ENGINE THRUST WAS APPROXIMATELY 15 PERCENT LOW BY 233 SECONDS.</p> <p>VEHICLE EFFECT-PRIMAFARE SUSTAINER ENGINE SHUTDOWN. SUSTAINER/VERNIER ENGINE SHUTDOWN OCCURRED 3.66 SECONDS EARLY DUE TO LOW DEPLETION.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>									
PROPULSION-M1-A/B SUSTAINER	FT44387/P1-201-00-11 GAS GENERATOR	PRP	11B 590120	11/ETR	YES	ROCKETDOME			893886
<p>FAILURE MODE-OUT OF TOLERANCE. THE TIME FOR SUSTAINER GAS GENERATOR BLADE VALVE CLOSING CONTROL SIGNAL TO FULL CLOSE WAS 80 MILLISECONDS FASTER THAN THE MINIMUM SPECIFIED TIME.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. 866 PROPPELLANT FLOW WAS SHUT OFF MORE RAPIDLY THAN SPECIFIED.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-THIS WAS NOT CONSIDERED A MAJOR DISCREPANCY SINCE 866 VALVE CLOSING PRECEDED THAT OF THE SUSTAINER ER PU VALVE BY A SATISFACTORY MARGIN.</p>									
PROPULSION-M1-A/B SUSTAINER	FT44317/P4-202-00-13	COUNTDOWN	13B 591230	14/ETR -2400	YES				893338
<p>FAILURE MODE-ERRATIC OPERATION. SUSTAINER OVER SPEED TRIP SIGNAL AFTER ENGINE RESET DURING THE LOOP TEST.</p> <p>SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS. PROPULSION RECEIVED SUSTAINER OVERSPEED TRIP SIGNAL AFTER ENGINE RESET DURING THE LOOP TEST.</p> <p>VEHICLE EFFECT-COUNTDOWN DELAYED. 15 MINUTES HOLD.</p> <p>CORRECTIVE ACTION-A CIRCUITRY CHECK WAS PERFORMED. NO IRREGULARITIES DISCOVERED. RESUMED COUNT.</p>									
PROPULSION-M1-A/B SUSTAINER	FTA 4312/P4-201-00-13 SUSTAINER FUEL VALVE, SEAL	PRP	13B 591222	14/ETR	YES				
<p>FAILURE MODE-LEAK-EXTERNAL. THE SUSTAINER FUEL VALVE RESEATED IMPROPERLY, CAUSING A LEAK AND A POST RUN FIRE IN THE PLANE DUCT. CAUSE OF THE IMPROPER SEATING WAS A BROKEN LIP SEAL.</p>									

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-UNKNOWN.						891764
PROPULSION-M41-A/B SUSTAINER	PTA4322/PI-202-00-9 366LOWREGULATOR/BOLTS	PHF	98 581024	11/ETR	YES NO	890673
FAILURE MODE-FAIL DURING OPERATION. A SUSTAINER PUMP OVERSPEED CUTOFF WAS SIGNALLED AT PLUS 1.0 SECOND. THE PUMP OVERSPEED WAS CAUSED BY A POORLY REGULATED 366 LOX FLOW. POSSIBLE CAUSE WAS THE MOUNTING BOLTS OF THE 366 LOX REGULATOR BEING LOOSE.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. A SUSTAINER PUMP OVERSPEED CUTOFF.						
VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED.						
CORRECTIVE ACTION-REPLACE 366 LOX FLOW REGULATOR AND ASSOCIATED COMPONENTS.						
PROPULSION-M41-A/B SUSTAINER	PTA4311/PI-201-00-9 GAS GENERATOR	PHF	98 581014	11/ETR 0	YES NO	891806
FAILURE MODE-OUT OF TOLERANCE. SUSTAINER ENGINE DID NOT COME UP TO OPERATING LEVEL DUE TO AN OBSTRUCTION AT THE SEP ARATION FITTING OF THE 366 LOX START LINE. THIS CAUSED LOX STARVATION TO THE 366.						
SYSTEM EFFECT-OPERATION TOO LOW. SUSTAINER ENGINE CAME UP TO OPERATING LEVEL.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-REPLACE SEPARATION FITTING AND 366 LOX REGULATOR.						
PROPULSION-M41-A/B SUSTAINER	PTA4311/PI-201-00-9 LOWREGULATOR	PHF	98 581014	11/ETR 1200	YES NO	891766
FAILURE MODE-OUT OF TOLERANCE. SUSTAINER LOX REGULATOR REFERENCE PRESSURE WAS 636 PSIG. REDLINE IS 625 PSIG.						
SYSTEM EFFECT-OPERATION TOO HIGH. SUSTAINER LOX REGULATOR REFERENCE PRESSURE WAS TOO HIGH.						
VEHICLE EFFECT-COUNTDOWN DELAYED. HOLD TIME 94 MINUTES, RECYCLE TIME 28 MINUTES.						
CORRECTIVE ACTION-RESET REGULATOR SETTING.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRE OTM	VEHICLE NAME PART NO
PROPULSION-NAI-A/B SUSTAINER	ZB-7-079/11-206-C1-07	CAPTIVE	7B 500007	1-1/EDNA RDS 23.33	NO NO	000135
FAILURE MODE-PREMIATURE OPERATION. PREMIATURE ENGINE SHUTDOWN OCCURED DUE TO SPURIOUS ACTIVATION OF THE SUSTAINER ROU SH COMBUSTION CUTOFF DEVICE CAUSED BY A LOOSE SOLDER CONNECTION IN THE GROUND UNBILICAL PLUG P1009.						
SYSTEM EFFECT-OPERATION STOPS PREMIATURELY.						
VEHICLE EFFECT-PREMIATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION-REPAIR PLUG.						
PROPULSION-NAI-A/B SUSTAINER	ZB-7-079/11-204-C1-07 THRUST CHANGER	CAPTIVE	7B 500009	1-1/EDNA RDS 61.78	YES NO	000137
FAILURE MODE-FAIL DURING OPERATION. THE SUSTAINER ENGINE PERFORMANCE WAS BELOW NOMINAL THROUGHOUT THE TEST, APPAREN TLY AS A RESULT EITHER OF A RESTRICTION IN THE 866 LOX FEED LINE OR A MALFUNCTION IN THE LOX REFERENCE REGULATOR.						
SYSTEM EFFECT-OPERATION TOO LOW. LOW SUSTAINER OPERATION RESULTED IN ROUGH COMBUSTION CUTOFF.						
VEHICLE EFFECT-PREMIATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-NAI-A/B SUSTAINER	ZB-7-079/15-217-CA-01 PROPELLANT UTILIZATION VALVE	CAPTIVE	1B 500020	32/8YC 2	YES NO	000097
FAILURE MODE-OUT OF SPECIFICATION. SLOW RESPONSE OF THE PU VALVE TO MOVE TO THE CONTROL POSITION RESULTED IN ROUGH COMBUSTION IN THE SUSTAINER ENGINE.						
SYSTEM EFFECT-ERRATIC OPERATION. ROUGH COMBUSTION IN THE SUSTAINER ENGINE.						
VEHICLE EFFECT-PREMIATURE PROPULSION CUTOFF. THE TEST WAS AUTOMATICALLY TERMINATED AS A RESULT OF AN ACCUMULATION OF RCC COUNT.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-NAI-A/B SUSTAINER	ZB-7-079/15-218-CA-01 PROPELLANT UTILIZATION VALVE	CAPTIVE	1B 500019	32/8YC 0	YES NO	000097
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE PROPELLANT UTILIZATION VALVE DID NOT OPEN. RECORDS INDICATE TH E OPENING SIGNAL WAS SENT AND POST TEST FUNCTIONAL CHECKS INDICATED NORMAL OPERATION OF THE VALVE.						
SYSTEM EFFECT-OPERATION STOPS PREMIATURELY. THE IGNITION DETECTOR DELAY TIMER EXPIRED WHEN THE DETECTOR LINES DID NO T BREAK.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.							093337
CORRECTIVE ACTION-UNKNOWN. RECORDS INDICATE THE OPENING SIGNAL WAS SENT AND POST-TEST FUNCTIONAL CHECKS INDICATED A NORMAL OPERATION OF THE VALVE.							
PROPULSION-WAI-A/B SUSTAINER	EM034/SE-B14-CA-01 SUSTAINER INJECTOR IGNITER SPRAY D 18K	CAPTIVE	18 540731	B-2/SVC 0.85	YES NO	ROCKETDYNE	090504
FAILURE MODE-FAIL DURING OPERATION.							
SYSTEM EFFECT-ERRATIC OPERATION.							
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.							
CORRECTIVE ACTION-THE ENGINE WAS REPLACED.							
PROPULSION-WAI-A/B SUSTAINER	PTA4081/PS-ECO-01-04 SIGNAL BLOCK	COMPOSITE-B FACT	48 540708	13/ETR	YES NO	ROCKETDYNE	093370
FAILURE MODE-OUT OF TOLERANCE. BLACK IN SUSTAINER SIGNAL BLOCK CREATED 8 CPS OSCILLATIONS IN THE YAW SERVO LOOP DURING THE STEP INPUTS.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE. TESTS SHOWED THAT BLACK OCCURRED ONLY UNDER NO THRUST CONDITIONS AND WOULD NOT EXIST DURING FLIGHT.							
PROPULSION-WAI-A/B SUSTAINER	PTA4081/PS-ECO-00-3 CIRCUIT, SUSTAINER SPEED TRIP	PRF	38 540827	.1/ETR PLUS 1.0 YES	YES YES		093340
FAILURE MODE-FAIL DURING OPERATION. CAUSE NOT DETERMINED. AFTER SIMILAR CUTOFF DURING TEST P1-EC03-00-3 THE SPEED SENSOR IN ENGINE GROUND BOX WAS DISABLED AND ANOTHER INSTALLED IN BLOCKHOUSE. SUPPLY VOLTAGE TO SPEED SENSORS WAS STABLE. A SIMILAR SIGNAL WAS OBSERVED ON TEST P1-EC04-00-3 WHERE NO SPEED SENSOR WAS ENABLED TO PRODUCE CUTOFF.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. AUTOMATIC SHUTDOWN. LAMP LINE OSCILLOSCOPE SHOWED PUMP SPEED NORMAL.							
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.							
CORRECTIVE ACTION-UNKNOWN.							

**FEDERAL BUREAU OF  
CORRECTIONS DIVISION**

**EFFICIENCY REVIEW-PROPULSION SYSTEM-AIRBORNE**

SYS- SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MAJ-A/S SUSTAINER	EM-1804/2E-211-84-01 SUSTAINER GAS GENERATOR LOX BLADE VALVE SEAL	CAPTIVE	1B 960818	2E/2YC 1.03	YES NO	ROCKETDYNE
FAILURE MODE--LEAK EXTERNAL. THE LOX BLADE VALVE SEALS WERE DAMAGED BY A MINOR EXPLOSION WHICH OCCURRED BETWEEN THE 366 TURBOCOMPRESSOR HEAD AND THE LOX MANIFOLD AT CUTOFF ON THE PREVIOUS TEST.						
SYSTEM EFFECT--EXPLOSION. LOX LEAKAGE PAST THE 366 BLADE VALVE SEALS SATURATED THE RESIDUAL MATERIAL IN THE 366. THE SUSTAINER TURBINE, AND 66 EXHAUST DUCT AND MANIFOLD. WHEN THE 366 IGNITERS WERE FIRED, THE RESULTING HYDROCARBON CE L'S EMPLOYED. SECONDARY EXPLOSION MAY HAVE OCCURRED IN THE EXHAUST DUCT AND MANIFOLD.						
VEHICLE EFFECT--LOSS OF VEHICLE INTEGRITY.						
CORRECTIVE ACTION--IT WAS RECOMMENDED THAT GAS GENERATOR PURGE PROCEDURES BE REVIEWED AND IMPLEMENTED TO INSURE ADEQUATE PURGE PRESSURES AND DURATION. DUE TO EXTENSIVE DAMAGE, THE MISSILE WAS RETURNED TO THE FACTORY FOR REPAIRS.						
PROPULSION-MAJ-A/S SUSTAINER	ZB-7-G79/2E-211-84-01 366 LOX BLADE VALVE SEAL.	CAPTIVE	1B 960818	2E/2YC 0	YES NO	ROCKETDYNE
FAILURE MODE--FAIL DURING OPERATION. A FAILURE OF THE 366 BLADE VALVE LOX SEALS ALLOWED LOX TO LEAK PAST THE CLOSED VALVE. GEL WAS FORMED WITH RESIDUAL HYDROCARBON WHICH IGNITED WHEN THE IGNITERS WERE FIRED.						
SYSTEM EFFECT--EXPLOSION. THE SUSTAINER GAS GENERATOR EXPLODED.						
VEHICLE EFFECT--PREMATURE PROPULSION SHUTDOWN.						
CORRECTIVE ACTION--UNKNOWN.						
PROPULSION-MAJ-A/S SUSTAINER	EX1034/2A-211-84-01 TURBO PUMP ELECTRONIC CUTOFF METHOD	CAPTIVE	1B 960817	2-2/2YC 1.11	YES NO	ROCKETDYNE
FAILURE MODE--FAIL DURING OPERATION. THE SUSTAINER PUMP OVERSPEED/UNDER SPEED CUTOFF NETWORK ERRONEOUSLY INITIATED CUTOFF. THE SUSTAINER ENGINE WAS IN A NORMAL THRUST RISE TRANSIENT. MAXIMUM RECORDED PUMP SPEED WAS 9,600 RPM.						
SYSTEM EFFECT--OPERATION STOPS PREMATURELY. THE ERRONEOUS CUTOFF SIGNAL RESULTED IN PREMATURE PROPULSION SYSTEM CUTOFF. VERIFIER OPERATION WAS 3.00 SECONDS.						
VEHICLE EFFECT--PREMATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION--SUBSEQUENTLY, THE CUTOFF LIMIT WAS RAISED FROM 11,000 RPM TO 11,400 RPM.						
PROPULSION-MAJ-A/S SUSTAINER	ZB-7-G79/2E-211-84-01 TURBO-PUMP, SWITCH	CAPTIVE	1B 960817	2E/2YC 1.11	YES NO	
FAILURE MODE--PREMATURE OPERATION. PREMATURE ENGINE CUTOFF OCCURRED DUE TO SPURIOUS ACTIVATION OF THE SUSTAINER TURBO PUMP TRIP.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY. VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. CORRECTIVE ACTION-UNKNOWN.						003510
PROPULSION-MA1-A/B SUSTAINER	DX-1034/32-E09-04-01 TURBOPUMPELECTRONICCUTOFFNETWORK	CAPTIVE	10 900613	3-2/3YC 1.17	YES NO	YES ROCKETDYNE	000580
	FAILURE MODE-FAIL DURING OPERATION. THE SUSTAINER PUMP OVERSPEED/UNDERSPEED CUTOFF NETWORK ERRONEOUSLY INITIATED CUTOFF. THE SUSTAINER ENGINE WAS IN A NORMAL THRUST RISE TRANSIENT. SYSTEM EFFECT-OPERATION STOPS PREMATURELY. THE ERRONEOUS CUTOFF SIGNAL RESULTED IN PREMATURE PROPULSION SYSTEM CUTOFF. VERNIER OPERATION WAS 3.00 SECONDS. VEHICLE EFFECT-PREMATURE PROPULSION ENGINE CUTOFF. CORRECTIVE ACTION-SUBSEQUENTLY, THE CUTOFF LIMIT WAS RAISED FROM 11.000RPM TO 11.400RPM. NO ERRONEOUS CUTOFFS HAVE OCCURRED SINCE.						003517
PROPULSION-MA1-A/B SUSTAINER	ZB-T-079/32-E09-44-01 TURBO PUMP SWITCH	CAPTIVE	10 900613	32/3YC 1.17	YES NO		003517
	FAILURE MODE-PREMATURE OPERATION. PREMATURE ENGINE CUTOFF OCCURRED DUE TO SPURIOUS ACTIVATION OF THE SUSTAINER TURBINE OVERSPEED TRIP. SYSTEM EFFECT-OPERATION STOPS PREMATURELY. VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. CORRECTIVE ACTION-UNKNOWN.						003523
PROPULSION-MA1-A/B SUSTAINER	PTA3070/P1-ECO-01-03 SIGNAL BLOCK	COMPOSITE-B FACT	30 900613	11/ETR	YES NO	YES ROCKETDYNE	003523
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. SUSTAINER ENGINE MOVEMENT HAD 6 CPS OSCILLATIONS WITH HIGH OVERSHOOTS IN THE TAN SERVO LOOP WITH APPLICATION OF A STEP VOLTAGE TO THE TAN SERVO LOOP. THIS ALSO OCCURRED ON MISSILE 48 AND WAS TRACED TO SLACK IN THE SIGNAL BLOCK UNDER NO THRUST CONDITIONS. REF. PTA 4091. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-NONE.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MAS-A/B SUSTAINER	EM-1029/TEST 14-501-A1 LUBE OIL TANK	CAPTIVE	580804	1-6/CDMA YES RDS NO 9. SEC.	YES	993004
<p>FAILURE MODE-FAILED TO OPERATE AT PRESCRIBED TIME. CUTOFF WAS INITIATED MANUALLY WHEN GRAPHIC RECORDING OF SUSTAINER R LUBE OIL MANIFOLD PRESSURE FAILED TO COME UP TO REQUIRED OPERATING LEVEL. RESULTS OF LUBE OIL BLOWDOWN TEST INDICATED NO DIFFICULTIES. CAUSE WAS PROBABLE RESULT OF AN ANOMALY IN INSTRUMENTATION.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-PREATURE PROPULSION SHUTDOWN. PLANNED RUN DURATION WAS 10.9 SECONDS. ACTUAL WAS 9.42 SECONDS.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MAS-A/B SUSTAINER	ZB-7-079/52-203-01 TURBO PUMP-SWITCH	CAPTIVE	18 580430	22/3VC 11.39	YES NO	993516
<p>FAILURE MODE-PREATURE OPERATION. PREATURE ENGINE CUTOFF OCCURRED DUE TO SPURIOUS ACTIVATION OF THE SUSTAINER TURBINE OVER SPEED TRIP.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY.</p> <p>VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-REPLACE OVERSPEED UNIT.</p>						
PROPULSION-MAS-A/B SUSTAINER	ZB-7-079/52-203-A2-01 TURBO PUMP SWITCH	CAPTIVE	18 580429	22/3VC 11.27	YES NO	993516
<p>FAILURE MODE-PREATURE OPERATION. PREATURE ENGINE CUTOFF OCCURRED DUE TO SPURIOUS ACTIVATION OF THE SUSTAINER TURBINE OVERSPEED TRIP.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY.</p> <p>VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MAS-A/B SUSTAINER	ZB-7-079/52-201-A1-01 906 FUEL LINE SCREEN	CAPTIVE	18 580320	22/3VC 9	YES NO	993516
<p>FAILURE MODE-CUT OF SPECIFICATION-ABNORMAL SUSTAINER ENGINE OPERATION RESULTED FROM INADVERTENTLY PLUGGING OF THE SUSTAINER GAS GENERATOR FUEL FEED LINE SCREEN WITH DESICCANT.</p> <p>SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. THE SUSTAINER TURBINE INLET DUCT RUPTURED.</p> <p>VEHICLE EFFECT-NONE. ENGINE CUTOFF BY TIMER.</p>						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M1-A/B SUSTAINER	ZM-7-545/14-204 SUSTAINER TURBO PUMP	CAPTIVE	580104	1-4/EDMA YES RDS NO 1.62		YES ROCKETDYNE	083512
FAILURE MODE-FAIL DURING OPERATION. POST TEST HARDWARE INVESTIGATION INDICATED A DETONATION OCCURRED IN THE AREA OF THE LOX PUMP SEAL CHAIN DUE TO CAUSE/S UNKNOWN. RESULT OF DETONATION WAS RUPTURE OF THE LOX PUMP VOLUME AND SUBSEQUENT MAJOR LOX LEAKAGE.							
SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. AS A RESULT OF THE MAJOR LOX LEAKAGE THROUGH THE FRACTURED LOX PUMP VOLUME, THE SUSTAINER AND VERNIER ENGINES FLAMED OUT.							
VEHICLE EFFECT-PREATURE PROPULSION SHUTDOWN. FOLLOWING SHUTDOWN THE EXHAUST GASES MIXED WITH THE LEAKING LOX AND INITIATED AN EXPLOSION WHICH DESTROYED THE THRUST SECTION.							
CORRECTIVE ACTION-RECOMMENDATIONS FOR CORRECTIVE ACTION ARE LISTED ON PAGE 4 AND 9 OF REPORT ZM-7-545 SUPPLEMENT TO INVESTIGATING COMMITTEE REPORT.							
PROPULSION-M1-A/B SUSTAINER	ZM-7-545/14-203 SUSTAINER LOX REGULATOR DIAPHRAGM	CAPTIVE	571227	1-4/EDMA YES RDS NO G		YES ROCKETDYNE	083530
FAILURE MODE-FAIL TO OPERATE. THE SUSTAINER ENGINE DID NOT REACH BOOTSTRAP OPERATION DUE TO A RUPTURE IN THE SUSTAINER LOX REGULATOR WHICH CAUSED A PARTIAL LOSS OF LOX REGULATOR REFERENCE PRESSURE. REGULATOR DIAPHRAGM RUPTURED.							
SYSTEM EFFECT-OPERATION TOO LOW. SUSTAINER CHAMBER PRESSURE REACHED A MAXIMUM OF 300 PSIG, AND 864 CHAMBER PRESSURE WAS 205 PSIG MAXIMUM.							
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF. MAINSTAGE LIMITER CUTOFF.							
CORRECTIVE ACTION-REPLACE LOX REGULATOR.							
PROPULSION-M1-A/B SUSTAINER	ZB-7-007 PART 2/14-132 LUBE OIL TANK PRESSURE SWITCH	CAPTIVE	570509	1-4/EDMA YES RDS NO D		YES	083074
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE LUBE OIL PRESSURE SWITCH DID NOT ACTUATE.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. LUBE OIL CUTOFF RESULTED FROM THE SWITCH MALFUNCTION.							
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.							
CORRECTIVE ACTION-REPLACE SWITCH.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OIM	VENDOR NAME VENDOR PART NO
PROPULSION-MAI-A/B VERNIER	FT44379/P1-202-00-10 VENT VERNIER FUEL TANK	PRF	9C 990824	12/ETR 2.136	YES NO	
<p>FAILURE MODE-FAIL DURING OPERATION. HELIUM WAS VENTED FROM VERNIER FUEL TANK INTO THRUST COME THENCE INTO THE TANK OUTLET TO THE SUSTAINER. CUTOFF AUTOMATICALLY FOLLOWED FUEL PUMP UNLOADING AND SUSTAINER TURBINE OVERSPEEDING AT 2.136 SEC. INFO REPRESENTS CONCLUSIONS FROM INVESTIGATION BY A CONVAIR INVESTIGATION COMMITTEE.</p> <p>SYSTEM EFFECT-EXPLOSION. LOE WAS RELEASED BY CAUSES NOT FULLY DETERMINED. FIRE AND EXPLOSION FOLLOWED.</p> <p>VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. DESTROYED VEHICLE AND DAMAGED THE LAUNCH AREA.</p> <p>CORRECTIVE ACTION-LAUNCH AREA REPAIR. MISSILE FAILURE DID NOT REQUIRE ACTION SINCE IT WAS A UNIQUE DESIGN.</p>						
PROPULSION-MAI-A/B VERNIER	FT44379/P1-202-00-11 VALVE	COUNTDOWN	11B 990804	11/ETR -800	NO NO	
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. A BAD CONNECTION AT UNBILICAL PLODS RESULTED IN THE VERNIER VENT VALVES FAILING TO OPEN.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START. THE VERNIER VENT VALVES WOULD NOT OPEN DUE TO A BAD CONNECTION AT PLODS UNBILICAL.</p> <p>VEHICLE EFFECT-COUNTDOWN DELAYED. RECYCLE 25 MINUTES, HOLD 65 MINUTES.</p> <p>CORRECTIVE ACTION-TIGHTEN UNBILICAL PLUG.</p>						
PROPULSION-MAI-A/B VERNIER	FT44413/P1-202-00-10 RELIEF VALVE, VERNIER PNEUMATIC HI ON PRESSURE	PRF	10B 991210	11/ETR -3	YES NO	
<p>FAILURE MODE-LEAK-EXTERNAL. REPORTED DURING H-1 LAY CHECKS APPROX. 9 HRS. BEFORE SCHEDULED FIRING.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-COUNTDOWN DELAYED. AT LEAST PART OF A 4 HOUR DELAY IN PICKING UP THE COUNT MAY BE ATTRIBUTED TO THIS PROBLEM.</p> <p>CORRECTIVE ACTION-VALVE REPLACED.</p>						
PROPULSION-MAI-A/B VERNIER	FT44413/P1-202-00-10 CHECK VALVE, ORIFICE	PRF	10B 991210	11/ETR -3	YES NO	
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. HIGH PRESSURE SURGE IS RETAINED IN LOS LINES FROM START TANK TO VE NIER PROPULSION VALVES AFTER PRESSURIZING. NORMAL CONTROL PRESSURE OF 750 PSI WAS INSUFFICIENT TO OPERATE VALVES. T HE SAME DIFFICULTY OCCURRED ON TEST P1-204-00-10.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START. CUTOFF OCCURS AFTER 8 SEC ON 14W 870 TIMER. CONCLUSION WAS NO LOS FLOW TO V</p>						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
EXHIBITS.							093011
VEHICLE EFFECT-PRIMATURE PROPULSION CUTOFF.							
CORRECTIVE ACTION-SUSTAINER BOOTSTRAP CHECK WLV WAS PORTED WITH NO. 60 DRILL.							
PROPULSION-MAI-A/B VERNIER	PTA4311/P1-201-00-9 DIAPHRAGM	PRF	98 201010	11/27R	YES NO	YES ROCKETDYNE	090072
FAILURE MODE-FAIL DURING OPERATION. THE VERNIER FUEL TANK PRESSURIZING DIAPHRAGM RUPTURED BEFORE TANK VENTING. THIS CAUSED AN IMPROPER MIXTURE RATIO, WHICH DAMAGED BOTH VERNIER CHAMBERS.							
SYSTEM EFFECT-ERRATIC OPERATION. VERNIER ENGINES OPERATED ERRATICALLY.							
VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. OBSERVER CUTOFF CALLED DUE TO ERRATIC VERNIER FLAME PATTERN.							
CORRECTIVE ACTION-REPLACED DIAPHRAGM AND VERNIER CHAMBERS.							
PROPULSION-MAI-A/B VERNIER	PTA4832/P4-201-00-08 THRUST CHAMBER-LOE DONE, SEAL	PRF	98 500008	14/27R	YES NO	YES ROCKETDYNE	093277
FAILURE MODE-LEAK-EXTERNAL. A LOE LEAK WAS NOTED AT THE V2 VERNIER ENGINE WHEN FILLS OF THE FIRING WERE VIEWED. THE LEAK WAS AT THE LOE DONE SEAL.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE V2 VERNIER ENGINE LOE DONE SEAL WAS REPLACED AND LEAK CHECKED.							
PROPULSION-MAI-A/B VERNIER	EM-1029/TEST 14-307-94 VERNIER FLAME DEFLECTORS	CAPTIVE	500013	1-4/EDNA RDS	NO NO		093002
FAILURE MODE-FAILED DURING OPERATION. V2 ENGINE DRIFTED FROM WALL POSITION AND BURNED THROUGH FLAME DEFLECTOR. ALSO DURING THE RUN NUMEROUS PROPULSION PARAMETERS EMITTED EXCESSIVE ZERO SHIFTS AS FLAME CURTAIN HAD FAILED AND EXCESSIVE HEAT HAD ENTERED THRUST SECTION.							
SYSTEM EFFECT-HIGH TEMPERATURE ENVIRONMENT. BURN THROUGH OF VERNIER FLAME DEFLECTORS.							
VEHICLE EFFECT-PRIMATURE PROPULSION SHUTDOWN. TERMINATED PREMATURELY BY AN OBSERVER WHEN V2 ENGINE DRIFTED FROM THE WALL POSITION AND BURNED THROUGH FLAME DEFLECTOR.							
CORRECTIVE ACTION-VERNIER FLAME DEFLECTORS WERE REMOVED AND VERNIER ENGINES WERE MECHANICALLY LOCKED IN WALL POSITION.							

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PROPULSION-MA1-A/B VERNIER	FTA4008/PS-801-00-4 REGULATOR-VERNIER LOZ	PRF	48 260718	11/ETR -4800	YES NO	YES ROCKETDOME	093290
FAILURE MODE-OUT OF TOLERANCE. THE VERNIER LOZ REGULATOR WAS NOT AT THE CORRECT SETTING.							
SYSTEM EFFECT-ERRATIC OPERATION. THE VERNIER LOZ REGULATOR WAS NOT SUPPLYING THE CORRECT PRESSURE.							
VEHICLE EFFECT-COUNTDOWN DELAYED. 15 MINUTE HOLD.							
CORRECTIVE ACTION-REGULATOR WAS RESET DURING HOLD.							
PROPULSION-MA1-A/B VERNIER	FTA4017/PI-803-00-3 VENT, VERNIER LOZ START TANK, OVER BOARD, CAP	PRF	30 260827	11/ETR -2	YES NO	YES	093341
FAILURE MODE-FAIL TO OPERATE. VENT LINE WAS CAPPED.							
SYSTEM EFFECT-OPERATION DOES NOT START. START TANK WAS NOT FILLED. 1 VERN PRESSURE SWITCH DID NOT PICK UP AND CUTOFF WAS CAUSED BY IGNITION STAGE TIMER 5 SEC AFTER VERN BOSS FILING.							
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF. COUNTDOWN WAS CONTINUED AFTER 45 MIN HOLD AND 65 MIN RECYCLE LOSS.							
CORRECTIVE ACTION-CAP REMOVED.							
PROPULSION-MA1-A/B VERNIER	FTA 4001/PI-802-00-3 VERNIER FUEL START TANK REGULATOR	PRF	30 260823	11/ETR	YES NO	YES ROCKETDOME	091472
FAILURE MODE-OUT OF EXPECTED TEST VALUE. JUST BEFORE IGNITION, THE REGULATOR OUTLET PRESSURE BEGAN TO CLIMB, AND STABILIZED ABOVE NORMAL AFTER SHUTDOWN.							
SYSTEM EFFECT-OPERATION TOO HIGH.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REGULATOR REPLACED AFTER TEST.							
PROPULSION-MA1-A/B VERNIER	ED-1028/ TEST-14-303-A3 VERNIER PLANE DEFLECTORS	CAPTIVE	260806	1-4/EDMA RDS	NO NO		093003
FAILURE MODE-FAILED DURING OPERATION. FAILURE OF VERNIER ENGINE TO HOLD HULL POSITION RESULTED IN BURN THROUGH OF 8 OTH PLANE DEFLECTORS. MISSING AT AFT END OF THRUST SECTION, STATION 1298, WAS SLIGHTLY BURNED IN QUADS 1, 11 AND 14.							
SYSTEM EFFECT-HIGH TEMPERATURE ENVIRONMENT RESULTED IN BURN THROUGH OF VERNIER PLANE DEFLECTORS.							
CORRECTIVE ACTION-BORN VERNIER ENGINE PLANE DEFLECTOR ASSEMBLIES REMOVED.							

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PROPULSION-M41-A/B VERNIER	FTAS044/P2-103-00-18 FUEL VALVE, FLANGE	FLIGHT	18A 980389	12/ETN	YES NO	097918
FAILURE MODE-FAIL TO OPERATE. A LEAK IN THE V1 FUEL LINE AT THE FLANGE ATTACH POINT TO V1 PROPELLANT VALVE. SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. V1 ENGINE NEVER INITIATED DUE TO DEPLETION OF FUEL FROM THE FUEL START TANK PRIOR TO VERNIER IGNITION. VEHICLE EFFECT-PREATURE VERNIER SHUTDOWN. CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M41-A/B VERNIER	FTAS044/P2-103-00-18 FLANGE	COUNTDOWN	18A 980389	12/ETN	YES NO	097917
FAILURE MODE-LEAK-EXTERNAL. LEAK IN FLANGE FITTING TO V1 ENGINE. SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. VERNIER START TANK PROPELLANT DEPLETED WHICH CAUSED THE FAILURE OF THE V1 ENGINE TO IGNITE. CORRECTIVE ACTION-REPAIR LEAK AT V1 FLANGE.						
PROPULSION-M41-A/B VERNIER	FTAS011/P4-103-00-13 THRUST CHAMBER	COUNTDOWN	18A 980401	12/ETN	YES NO	097472
FAILURE MODE-FAIL TO OPERATE. VERNIER NO. 2 ENGINE EXPLODED AT IGNITION SYSTEM EFFECT-EXPLOSION. EXPLOSION OCCURRED IN VERNIER NO 2 ENGINE AT IGNITION. THE VERNIER LOX DOME AND INJECTOR P LATE WERE BLOWN OFF AND FOUNDED 100 FEET FROM THE VEHICLE. VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. BOOSTER ENGINE IGNITION W- NOT EFFECTED AS A RESULT OF THE VERNIER PROBLEM AND CUTOFF WAS GENERATED BY THE BOOSTER IGNITION DELAY TIMER. CORRECTIVE ACTION-VERNIER ENGINE NO 2 AND FAIRING ASSEMBLY WERE REPLACED.						
PROPULSION-M41-A/B VERNIER	EC-7-004/P2-103-00-11 DUCTING-BIG10	FLIGHT	11A 980220	12/ETN 100.0	YES NO	
FAILURE MODE-FAIL DURING OPERATION. V2 ENGINE SHUTDOWN PROMPTLY AT 109.4 SECONDS, 6.6 SECONDS AFTER THE ENGINES WERE OSCILLATING BETWEEN THEIR STOP. POSSIBLE CAUSE OF SHUTDOWN IS DUE TO LOSS OF THE VERNIER LOX FEED LINE BETWEEN THE PROPELLANT VALVE AND THE THRUST CHAMBER. SYSTEM EFFECT-OPERATION STOPS PROMPTLY. V2 CHAMBER PRESSURE DATA INDICATED A STEADY STATE 80 PSI AFTER ENGINE SHUTDOWN.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PHI OTM	VENDOR NAME VENDOR PART NO
VEHICLE EFFECT-PROPULSION VERNIER ENGINE SHUTDOWN. VEHICLE WAS ALREADY UNSTABLE DUE TO FLIGHT CONTROL FAILURE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-MAI-A/B VERNIER	EM008/1A-107-06-14 VERNIER FUEL TANK PRESSURIZING SOL ENCLD	CAPTIVE	14A 900210	1A/EDMAR YES DS NO 124	YES NO	007248
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. VERNIER LOW TANK REPRESSURIZED AT 112 SECONDS BUT THE VERNIER FUEL TANK DID NOT BEGIN TO REPRESSURIZE UNTIL 124 SECONDS. THIS INDICATED SLUGGISH OPERATION OF THE VERNIER FUEL TANK PR ESSURIZING SOLENOID.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. PLANNED 3 SECONDS OF SOLO VERNIER ENGINE OPERATION WAS NOT ACHIEVED.						
VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. CUTOFF WAS INITIATED MANUALLY AT 124.5 SECONDS BECAUSE THE VERNIER FUEL TANK FAILED TO REPRESSURIZE AT THE PROPER TIME.						
CORRECTIVE ACTION-SOLENOID WAS REPLACED.						
PROPULSION-MAI-A/B VERNIER	FTAS242/PN-101-00-13 VERNIER ORIFICE.	PRF	13A 300131	14/CTR	YES NO	003337
FAILURE MODE-OUT OF TOLERANCE. THE ORIFICES USED ON THE VERNIER ENGINES FOR THIS VEHICLE CAUSED VERNIER THRUST TO BE 23 PERCENT LOW.						
SYSTEM EFFECT-OPERATION TOO LOW. VERNIER ENGINE THRUST WAS APPROXIMATELY 700 POUNDS WHEN 1000 POUNDS WAS EXPECTED.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-REDRIFTING WAS CONSIDERED. HOWEVER, THE FINAL DECISION WAS TO MAKE NO CORRECTIONS.						
PROPULSION-MAI-A/B VERNIER	EM008/1A-109-44-14 LOW ORIFICE	CAPTIVE	14A 300130	1A/EDMAR YES DS YES	YES YES	000256
FAILURE MODE-OUT OF EXPECTED TEST VALUE. DATA INDICATED LOW V1 CHAMBER PRESSURE. COULD BE ATTRIBUTED TO, (1) THE V1 LOW FLOW ORIFICE WAS INSTALLED WITH THE BEVELLED EDGE OF THE ORIFACE FACING DOWNSTREAM RATHER THAN UPSTREAM AND/OR (2) A LOW LEAK WAS PRESENT AT THE V1 LOW INLET INSTRUMENTATION YES.						
SYSTEM EFFECT-OPERATION TOO LOW. THE VERNIER (V1) CHAMBER PRESSURE WAS READING 325 PSIG INSTEAD OF THE EXPECTED 340 PSIG.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NO-2	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO
PROPULSION-WA1-A/B VERNIER	DM800/1A-103-A4-14 LOX INSTRUMENTATION INLET TEE	CAPTIVE	14A 900120	1A/EDWAR DS YES	YES	901763
FAILURE MODE-OUT OF EXPECTED VALVE. DATA INDICATED LOW V1 CHAMBER PRESSURE. COULD BE ATTRIBUTED TO A LOX LEAK AT THE V1 LOX INLET INSTRUMENTATION TEE.						
SYSTEM EFFECT-OPERATION TOO LOW. V1 CHAMBER PRESSURE WAS READING 323 PSIG INSTEAD OF THE EXPECTED 340 PSIG.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-WA1-A/B VERNIER	DM800/1A-104-A3-14 FUEL FILL AND CHECK VALVE	CAPTIVE	14A 900120	1A/EDWAR DS 2.2	YES NO	902251
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. EA RECORDERS INDICATE THAT THE VERNIER FUEL TANK PRESSURIZING SOLE NOID DE-ACTIVATED AT 2.2 SECONDS, HOWEVER, THE TANK DID NOT VENT UNTIL 21 SECONDS. APPARENTLY THE VERNIER FUEL TANK FILL AND CHECK VALVE REMAINED OPEN, ALLOWING A HIGH FUEL FLOW TO THE VERNIER TANK.						
SYSTEM EFFECT-OPERATION TOO LOW. THE VERNIER PERFORMANCE WAS LOW UNTIL THE VERNIER FUEL TANK VENTED.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN. POST-TEST EXAMINATION OF THE VALVE INDICATED PROPER OPERATING CHARACTERISTICS.						
PROPULSION-WA1-A/B VERNIER	DM800/1A-103-A2-14 VERNIER RELIEF VALVE	CAPTIVE	14A 900121	1A/EDWAR DS DS	YES NO	902232
FAILURE MODE-FAILED DURING OPERATION. THE COMBINATION VERNIER LOX TANK VENT AND RELIEF VALVE PROVE IN THE CLOSED POSITION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-WA1-A/B VERNIER	DM800/1A-103-A2-14 VERNIER LOX ORIFICE	CAPTIVE	14A 900121	1A/EDWAR DS DS	YES NO	902232
FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE VERNIER LOX INLET PRESSURES WERE BELOW THE EXPECTED VALUES DUE TO INCORRECT ORIFICE SIZE. PLANNED ORIFICE WAS INSTALLED.						
SYSTEM EFFECT-OPERATION TOO LOW.						
VEHICLE EFFECT-NONE.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	GIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
	CORRECTIVE ACTION-THE VERNIER LOW PRESSURE LINES WERE RE-CRIPICED PRIOR TO THE NEXT TEST.						000233
PROPULSION-MAI-A/B VERNIER	EN-779/9-1, 104-A3-09 VE PRESSURE SWITCH	CAPTIVE	9A 971204	9-1/8YC 0	YES NO	YES ROCKETDYNE	000834
	FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. TEST TERMINATED BY A DEFECTIVE VE PRESSURE SWITCH WHICH FAILED TO CLOSE WHEN VE CHAMBER PRESSURE REACHED PRESSURE SWITCH ACTIVATION VALUE OF 800 PLUS OR MINUS 10 PSIG.						
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY.						
	VEHICLE EFFECT-PREMATURE VERNIER ENGINE SHUTDOWN.						
	CORRECTIVE ACTION-REPLACE SWITCH.						
PROPULSION-MAI-A/B VERNIER	EN-771/91-102-A2-09 VE PURGE CHECK VALVE	CAPTIVE	9A 971121	9-1/8YC NO	YES NO		000830
	FAILURE MODE-LEAK. VE PURGE CHECK VALVE FOUND STUCK IN OPEN POSITION WHEN A HOLD WAS CALLED TO INVESTIGATE A FUEL LEAK AT THE PURGE MANIFOLD. STICKY, NON-IMPACT SENSITIVE SUBSTANCE DISCOVERED AS HOLDING CHECK VALVE OPEN.						
	SYSTEM EFFECT-POSSIBLE CONTAMINATION OF LOW PORTION OF VERNIER ENGINE WITH FUEL. AT SECOND ATTEMPT TO LAUNCH, AN EXPLOSION IN VERNIER ENGINE WOULD RESULT.						
	VEHICLE EFFECT-POSSIBLE FIRE AND LOSS OF MISSILE.						
	CORRECTIVE ACTION-REPLACE CHECK VALVE.						
PROPULSION-MAI-A/B VERNIER	EN-7931-1,112-8P3-09 VERNIER FUEL START TANK PRESSURE, ORIFICE	CAPTIVE	9A 971024	EDWARDS NO	YES NO	YES ROCKETDYNE	000827
	FAILURE MODE-LEAK-EXTERNAL-VERNIER FUEL START TANK ORIFICE INSTALLATION WAS LOOSE CAUSING THE VERNIER FUEL START TANK TO LEAK.						
	SYSTEM EFFECT-NONE. SYSTEM WAS NOT IN OPERATION.						
	VEHICLE EFFECT-COUNTDOWN DELAYED.						
	CORRECTIVE ACTION-THE CONNECTION WAS TIGHTENED.						
PROPULSION-MAI-A/B VERNIER	EN-800/1A, 111-00-08 VERNIER ENGINE	CAPTIVE	9A 971009	1A/EDWARDS 08	YES NO	YES ROCKETDYNE	
	FAILURE MODE-STRUCTURAL-POST TEST INSPECTION REVEALED EROSION WITHIN THE VERNIER NO. 8 ENGINE THROAT.						
	SYSTEM EFFECT-NONE.						

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VEHICLE EFFECT-NONE.							000320
CORRECTIVE ACTION-VERNIER ENGINE WAS REPLACED.							
PROPULSION-MAS-A/B VERNIER	FTAL79/P4-101-00-04 VALVE-FILL AND CHECK	PRF	4A 570320	14/ETR	YES NO		000320
FAILURE MODE-FAIL DURING OPERATION. FUEL START TANK FILL AND CHECK VALVE STUCK. SYSTEM EFFECT-OPERATION STOPS PREMATURELY. VEHICLE EFFECT-COUNTDOWN DELAYED. A HOLD WAS EXTENDED 154 MINUTES. CORRECTIVE ACTION-REPLACED FUEL START TANK FILL AND CHECK VALVE.							
PROPULSION-MAS-A/B VERNIER	08-7-007 PART 2-121 VERNIER ENGINE PRESSURE SWITCH	CAPTIVE	570437	1-4/EDMA RDS	YES NO		004059
FAILURE MODE-FAIL TO OPERATE. VERNIER ENGINE PRESSURE SWITCHES WERE FOUND MOISTURE CONTAMINATED. SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS-MOISTURE CONTAMINATED VERNIER ENGINE PRESSURE SWITCHES SHORTED OUT PROMISING START SIGNAL FROM REACHING THE BOOSTER ENGINE START CIRCUITRY. VEHICLE EFFECT-PREMATURE PROPULSION SHUTDOWN-THE TEST WAS PREMATURELY TERMINATED WHEN IGNITION STAGE WAS NOT ACHIEVED. CORRECTIVE ACTION-SWITCH POTTING WAS ACCOMPLISHED.							
PROPULSION-MAS-A/B VERNIER	28-7-007 PART 2/14,127 VZ THRUST CHAMBER LOX INJECTOR	CAPTIVE	570424	1-4/EDMA RDS 0	YES NO		005076
FAILURE MODE-ERRATIC OPERATION. VZ CHAMBER HAD LOX DOME AND INJECTOR BURNED AWAY, THEREFORE, ERRATIC OPERATION CAUSED SHUTDOWN. SYSTEM EFFECT-ERRATIC OPERATION. VEHICLE EFFECT-PREMATURE VERNIER ENGINE CUTOFF. CORRECTIVE ACTION-REPLACE VERNIER ENGINE.							
PROPULSION-MAS-A/B VERNIER	28-7-007PARTS-126 VERNIER ENGINE PRESSURE SWITCH	CAPTIVE	570423	1-4/EDMA RDS	YES NO		
FAILURE MODE-FAIL TO OPERATE. VERNIER ENGINE PRESSURE SWITCHES WERE FOUND MOISTURE CONTAMINATED.							

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	SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS-MOISTURE CONTAMINATED VERNIER ENGINE PRESSURE SWITCHES SHORTED OUT PROHIBITING START SIGNAL FROM REACHING THE BOOSTER ENGINE START CIRCUITRY.						085030
	VEHICLE EFFECT-PREATURE PROPULSION CUTOFF. THE TEST WAS PREMATURELY TERMINATED WHEN MAINSTAGE WAS NOT ACHIEVED.						
	CORRECTIVE ACTION-EVENTUAL SWITCH POTTING.						
PROPULSION-MA1-A/B VERNIER	ZB-7-087 PART 2-123 VERNIER ENGINE PRESSURE SWITCH	CAPTIVE	970420	1-4/EDMA RDS	YES NO	ROCKETDYNE	084098
	FAILURE MODE-FAIL TO OPERATE. VERNIER ENGINE PRESSURE SWITCHES WERE FOUND MOISTURE CONTAMINATED.						
	SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS-MOISTURE CONTAMINATED VERNIER ENGINE PRESSURE SWITCHES SHORTED OUT PROHIBITING START SIGNAL FROM REACHING THE BOOSTER ENGINE START CIRCUITRY.						
	VEHICLE EFFECT-PREATURE PROPULSION SHUTDOWN-THE TEST WAS PREMATURELY TERMINATED WHEN IGNITION STAGE WAS NOT ACHIEVED.						
	CORRECTIVE ACTION-SWITCH POTTING WAS ACCOMPLISHED.						
PROPULSION-MA1-A/B VERNIER	ZB-7-087 PART 2-123 VERNIER ENGINE PRESSURE SWITCH	CAPTIVE	970419	1-4/EDMA RDS	YES NO	ROCKETDYNE	084097
	FAILURE MODE-FAIL TO OPERATE. VERNIER ENGINE PRESSURE SWITCHES WERE FOUND MOISTURE CONTAMINATED.						
	SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS-MOISTURE CONTAMINATED VERNIER ENGINE PRESSURE SWITCHES SHORTED OUT PROHIBITING START SIGNAL FROM REACHING THE BOOSTER ENGINE START CIRCUITRY.						
	VEHICLE EFFECT-PREATURE PROPULSION SHUTDOWN-THE TEST WAS PREMATURELY TERMINATED WHEN IGNITION STAGE WAS NOT ACHIEVED.						
	CORRECTIVE ACTION-SWITCH POTTING WAS ACCOMPLISHED.						
PROPULSION-MA1-A/B VERNIER	ZB-7-087 PART D-120 VERNIER ENGINE PRESSURE SWITCH	CAPTIVE	970417	1-4/EDMA RDS	YES NO	ROCKETDYNE	085073
	FAILURE MODE-FAIL TO OPERATE. VERNIER ENGINE PRESSURE SWITCHES WERE FOUND MOISTURE CONTAMINATED.						
	SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS-MOISTURE CONTAMINATED VERNIER ENGINE PRESSURE SWITCHES SHORTED OUT PROHIBITING START SIGNAL FROM REACHING THE BOOSTER ENGINE START CIRCUITRY.						
	VEHICLE EFFECT-PREATURE PROPULSION CUTOFF-THE TEST WAS PREMATURELY TERMINATED WHEN MAINSTAGE WAS NOT ACHIEVED.						
	CORRECTIVE ACTION-SWITCH POTTING WAS ACCOMPLISHED.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRJ OTM	VENDOR NAME VENDOR PART NO
PROPULSION-M1-A/B LOX FEED	78-11.1138P-6 VERNIER LOX DUCT	CAPTIVE 7-78319	SA 871059	1-1/EDMA RDS	YES NO	
<p>FAILURE MODE-EXTERNAL LEAK-DURING THE TEST THE PRESENCE OF VAPORS WAS EVIDENT IN THE VICINITY OF THE VE PROPELLANT VALVE. POST-TEST INSPECTION REVEALED THE LOX DUCT BEAM WELDS WERE LEAKING.</p> <p>SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-M1-A/B GENERAL	88A4827-2 VALVE-FILL AND DRAIN LOX	UTP-PRT 27-02102-831	860215	60/C	YES	STRATOR 59-480-02
<p>FAILURE MODE-ACTUATOR FAILURE-FAILURE OF MOTOR WAS CAUSED BY INSTALLATION OF EXTRA-LONG WIRE LEAD WHICH DRAGGED ON THE ARMATURE BEARING THROUGH THE INSULATION AND SHORTING THE MOTOR</p> <p>CORRECTIVE ACTION-QUALITY ASSURANCE REJECTED THE LOT AND THE VENDOR REPLACED POTENTIALLY DEFECTIVE ACTUATORS WITH A NEW SATISFACTORY ACTUATORS. MANUFACTURING PROCEDURES HAVE BEEN MODIFIED TO PRECLUDE REOCCURRENCE OF THIS PROBLEM.</p>						
PROPULSION-M1-A/B GENERAL	2C-7-223/P2-33N-01-11	COMPOSITE-FPD/OML	11C 790608	12/ETR	YES NO	
<p>FAILURE MODE-LEAK-EXTERNAL. AFTER THE TANKING TEST, 3 MINOR FUEL LEAKS WERE FOUND. (NO FURTHER DATA).</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-LEAKS REPAIRED.</p>						
PROPULSION-M1-A/B GENERAL	2C-7-215/P4-213-00-13 THRUST CHAMBERS	FLIGHT	138 590113	13/ETR 100	YES NO	
<p>FAILURE MODE-FAIL DURING OPERATION. SYMMETRICAL LOSS OF THRUST OF BOOSTER AND SUBSTANTIAL ENGINES. NO TELEMETRY SYSTEM WAS CARRIED SO THE EXACT CAUSE WAS NOT DETERMINED. FLIGHT CONTROL SYSTEM WAS AFFECTED. POSSIBLE CAUSE OF FAILURE IS EXCESSIVE HEAT IN THE ENGINE COMPARTMENT.</p> <p>SYSTEM EFFECT-OPERATION STOPS PROMPTLY. ANALYSIS OF RE-ENTRY VEHICLE TELEMETRY DATA AND TRACKING DATA INDICATED LOSS OF THRUST AT 108 SECONDS.</p> <p>VEHICLE EFFECT-PRE-ENTRY PROPULSION SHUTDOWN. MISSILE INSTABILITY PROMPTED.</p>						

11 JAN 1968

GENERAL SYSTEMS CO  
COMBUSTION DIVISION

DIFFICULTIES DETECTED-PROPULSION SYSTEMS-J11000000

SYSTEM NO-37574	TEST/REPAIR NUMBER FAILED COMPONENT NAME	DTF DATA SOURCE PART NUMBER	VEHICLE DATE OFP	SITE TIME OFP	PRELIMINARY VEHICLE NAME
CORRECTIVE ACTION-NONE.					
PROPULSION-HA1-A/B GENERAL	28-7-075/11-003-02-07 STARTING DISCONNECT	CAPTIVE	78 900010	1-1/2 NO	NO
FAILURE MODE-ERRATIC OPERATION. ACCELERATION VALVE SENSORS OCCURRED DUE TO MALFUNCTIONING OF THE PROPULSION ELECTRIC AL STAGES DISCONNECT.					
SYSTEM EFFECT-ERRATIC OPERATION. THE PROPULSION SYSTEM OPERATION WAS ERRATIC.					
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.					
CORRECTIVE ACTION-NONE.					
PROPULSION-HA1-A/B GENERAL	28-7-075/11-003-02-07 FAILURE MODE-PREATURE OPERATION. IGNITION DETECTOR DELAY TIMER INITIATED CUTOFF WHEN THE GROUND FUEL START TANK OR EXHAUST VALVE MALFUNCTIONED.	CAPTIVE	78 900010	1-1 NO	NO
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.					
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.					
CORRECTIVE ACTION-REPLACE BREAKAWAY VALVE.					
PROPULSION-HA1-A/B GENERAL	28-7-075/11-003-02-07 FAILURE MODE-PREATURE OPERATION. PREMATURE ENGINE CUTOFF WAS INITIATED WHEN A HIGH TEMPERATURE WAS INDICATED ERRON DOUSLY IN THE INHUST SECTION DUE TO AN INSTRUMENTATION MALFUNCTION.	CAPTIVE	18 900009	32/3YC 21-03	NO
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.					
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.					
CORRECTIVE ACTION-REPAIR INSTRUMENTATION.					
PROPULSION-HA1-A/B GENERAL	28-7-075/11-003-02-07 FAILURE MODE-FAILED TO OPERATE AT PRESCRIBED TIME. PREMATURE ENGINE CUTOFF WAS INITIATED WHEN VERIFIED FUEL TANK PRE SURE FAILED TO RECORD PRESSURE DUE TO AN INSTRUMENTATION MALFUNCTION. CUTOFF OCCURRED BETWEEN COMBAT START AND VERMI OR IGNITION.	CAPTIVE	18 900030	32/3YC NO	NO
SYSTEM EFFECT-OPERATION DOES NOT START.					
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.					
CORRECTIVE ACTION-REPAIR INSTRUMENTATION.					

GENERAL DYNAMICS  
CONVAIR DIVISION

15 JUN 1964

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	GIP DATA SOURCE PART NUMBER	VEHICLE DATE GIP	SITE TIME DIF	PRI O7H	VENDOR NAME VENDOR PART NO
PROPULSION-MA1-A/B GENERAL	28-7-079/32-EC1-A1-03 ENGINE RELAY BOX, PIN	CAPTIVE	18 980320	32/JYC 9	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-FAIL DURING OPERATION. AN ABNORMAL SHUTDOWN SEQUENCE RESULTED FROM A GROUNDING IN THE ENGINE RELAY BOX.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. PREMATURE ENGINE SHUTDOWN.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-REPAIR WIRING.</p>						
PROPULSION-MA1-A/B GENERAL	FTA2710/P4-103-00-15 ENGINE RELAY BOX	PRF	15A 980310	14/ETR	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-OUT OF SPECIFICATION. ENGINE RELAY BOX WAS AN UNMODIFIED TYPE AND NOT SUITABLE FOR OPERATION.</p> <p>SYSTEM EFFECT-ERRATIC OPERATION. DURING THE IGNITER CHECK IN THE PRECOUNT, THE 906 IGNITER CIRCUIT DID NOT CHECK OUT PROPERLY.</p> <p>VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. THIS PROBLEM TOGETHER WITH ANOTHER PROBLEM CAUSED TEST CANCELLATION.</p> <p>CORRECTIVE ACTION-REPLACE ENGINE RELAY BOX.</p>						
PROPULSION-MA1-A/B GENERAL	FTA2710/P4-101-00-15 ENGINE RELAY BOX, RELAY	PRF	15A 980317	14/ETR	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-FAIL DURING OPERATION. THE FLIGHT LOCKIN RELAY IN THE ENGINE RELAY BOX FAILED.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START. PROPER OPERATION COULD NOT BE ATTAINED DUE TO FAILURE OF FLIGHT LOCKING RELAY IN ENGINE RELAY BOX.</p> <p>VEHICLE EFFECT-COUNTDOWN DELAYED. TOTAL COUNTDOWN HOLD TIME WAS 225 MINUTES. TIME CHARGED TO THIS PROBLEM IS INDICATE MINUTE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MA1-A/B GENERAL	EN000/1A-101-A1-14 ENGINE RELAY BOX	CAPTIVE	14A 980110	14/EDWAR DR	YES NO	
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. CAUSE OF SHUTDOWN, AS INDICATED BY EA RECORDS, WAS A PREPARATION IN COMPLETE CUTOFF. THE SOURCE OF CUTOFF WAS NOT KNOWN.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. THE PROPULSION SYSTEM OPERATION WAS TERMINATED PREMATURELY IN THE BOOSTER IGNITION PHASE.</p>						

GENERAL DYNAMICS  
CONVAIR DIVISION

15 JUN 1968

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	8117 TIME DIP	8117 UTM	VEHICLE DATE
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.						
CORRECTIVE ACTION-MINOR CIRCUITRY CHANGES AND INSTRUMENTING ADDITIONAL EA SEQUENCE MEASUREMENTS TO VERIFY PROBLEM ORATION.						
PROPULSION-MA1-A/B GENERAL	EN-7551-1.112-3P9-03 ENGINE RELAY BOX, RELAY WIRING	CAPTIVE	SA 871024	1-1/EDMA NO3	YES NO	8555418
FAILURE MODE-OUT OF TOLERANCE. THE ENGINE RELAY K-90C WAS WIRED INCORRECTLY.						
SYSTEM EFFECT-NONE. SYSTEM WAS NOT IN OPERATION.						
VEHICLE EFFECT-NONE. SYSTEM WAS NOT IN OPERATION.						
CORRECTIVE ACTION-THE ENGINE RELAY WAS REPLACED.						
PROPULSION-MA1-A/B GENERAL	ZB-7-057/102-1 LOX START TANK REGULATOR	CAPTIVE	1A 581221	31/3YC	YES NO	8858418
FAILURE MODE-OUT OF SPECIFICATION. BOOSTER START TANK REGULATOR PRESSURE DROPPED FROM 605 TO 190 PSI BETWEEN 0.0 A NO 0.6 SECONDS. AFTER HAVING RISEN FROM THE PRE-TEST SETTING OF 635 PSIG TO 605 PSIG, WHEN THE LOX START TANK WAS PURSUERIZED DURING THE PRE-TEST COUNTDOWN.						
SYSTEM EFFECT-OPERATION TOO HIGH.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MA1-A/B GENERAL	ZB-7-057/102-1 LOX START TANK	CAPTIVE	1A 581221	31/3YC	YES NO	8858417
FAILURE MODE-OUT OF SPECIFICATION. THE PRE-TEST LOX START TANK PRESSURE WAS APPROXIMATELY 107 PSI HIGHER THAN THE PLANNED SETTING.						
SYSTEM EFFECT-OPERATION TOO HIGH.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						

15 JUN 1988

GENERAL DYNAMICS  
COMBAT DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME C/F	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MAL-A/B GENERAL	2C-T-038/14-103-18 REGULATOR	CAPTIVE	860703	1-4/EDMA YES NOB NO			090430
FAILURE MODE-OUT OF EXPECTED TEST VALUE. LOW PERFORMANCE WAS CAUSED BY THE LOX START TANK PRESSURE REGULATOR REGULATING TOO LOW (490 PSIG RECORDED AND 860 PSIG SPECIFIED).							
SYSTEM EFFECT-OPERATION TOO LOW.							
VEHICLE EFFECT-PRIMATURE PROPULSION CUTOFF. MANUAL CUTOFF WHEN TURBOPUMP PERFORMANCE WAS TOO LOW.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-MAL-A/B	SP-90-08-3129F TUBE ASSEMBLY-OXIDIZER, B-NUT	FAR 27-11984-37	119D 630302	1-2/PALC YES NO			097306
FAILURE MODE-EXTERNAL LEAKAGE. B-NUT LEAKAGE. POSSIBLE STRESS RELAXATION. NUT WAS RETORQUED AND LEAK STOPPED. A TYP OF MAY 16, 1943 FROM VAFB CONFIRMED THAT TUBE ASSEMBLY WOULD NOT BE FORWARDED FOR ANALYSIS.							
CORRECTIVE ACTION-60/A IS CONDUCTING TESTS ON B-NUT STRESS RELAXATION. APPROPRIATE PERSONNEL WERE INFORMED OF THERE JECTION AND REQUESTED TO PAY PARTICULAR ATTENTION TO TORQUING B-NUTS, PER PAR 86-90-04-5649. MATERIAL USED TO MAKE B-NUT HAS BEEN CHANGED.							
PROPULSION-MAL-A/B	FTAZ128/P4-101-00-08 FITTING	COUNTDOWN	6A 570820	24 NO	YES NO		091867
FAILURE MODE-EXTERNAL LEAK. POST TEST INVESTIGATION REVEALED A CAPPED INSTRUMENTATION BOSS LEAKING.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPLACE CAP AND VALVE.							
PROPULSION-MAL-A/B BOOSTER	B2-4NO-01-81 BE IGNITER FUEL VALVE	COMPOSITE-FRQ/DPL	81D 631108	BE/NTR	YES NO	YES NO	093323
FAILURE MODE-LEAK EXTERNAL.							
SYSTEM EFFECT-CONTAMINATION.							
VEHICLE EFFECT-COUNTDOWN ABORTED.							
CORRECTIVE ACTION-TORQUED FITTING.							

GENERAL DYNAMICS  
CONVAIR DIVISION

13 JUN 1966

DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH VENDOR PART NO	VENDOR NAME
PROPULSION-MA2-A/B BOOSTER	80C/8K783-DA483-402-DD-88 TUBING-FLEX, 6 & LOOP	FLIGHT	84D 850527	85/MTR 116	YES NO	
<p>FAILURE MODE-LEAK-EXTERNAL. LEAK IN ONE OF THE FOUR BOOSTER GAS GENERATOR LOOP AREAS. LOX FEED SYSTEM, NOT GAS SYSTEM. PNEUMATIC REFERENCE SYSTEM AND FUEL FEED SYSTEM. LOX FEED SYSTEM CONSIDERED MOST PROBABLE. TWO FLEX HOSE SECTION 3 BETWEEN LOX REGULATOR AND 866 VALVE MOST SUSPECT.</p> <p>SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. LEAK IN 866 LOOP CAUSED DROP IN BOOSTER SYSTEM PERFORMANCE AND AT 122 S ECONDS RESULTED IN EXPLOSION IN THRUST SECTION. ENGINE SHUTDOWN RESULTED FROM EXPLOSION.</p> <p>VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. EXPLOSION IN THRUST SECTION CAUSED DAMAGE WHICH RESULTED IN VEHICLE SELF DESTRUCTION AT 218 SECONDS.</p> <p>CORRECTIVE ACTION-TORQUE REQUIREMENTS IN 866 LOX FEED LINE CLARIFIED. REQUIREMENT TO DISCONNECT 866 LOX FEED LINE F OR TRICH-FLUX WAS BEEN DISCONTINUED ON MA-2. SPECIAL INSTALLATION PROCEDURES FOR FLEX HOSES DEVELOPED. IMPLEMENTED SPECIAL INSPECTION OF POWER PACKAGE GAS GENERATOR SYSTEM LOOP.</p>						
PROPULSION-MA2-A/B BOOSTER	COA83-0680/83-403-DD-142 LOX REGULATOR	FLIGHT	142D 831028	8-3/MTR 83.	YES NO	
<p>FAILURE MODE-FAILED DURING OPERATION-THE LOX REGULATOR REFERENCE LEVEL SHIFTED MOST PROBABLY DUE TO THE REGULATOR S TICKING.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW-ENGINE PERFORMANCE LEVEL CHANGED. BOTH BOOSTER THRUST CHAMBER PRESSURES DECREASED A PROXIMATELY 3 PSI EACH AND THE 866 COMBUSTOR CHAMBER PRESSURE DECREASED 6 PSI.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE.</p>						
PROPULSION-MA2-A/B BOOSTER	AE82-0780/82-404-DD-87 BOOSTER CONTROL PNEUMATIC REGULATOR	FLIGHT	87D 850408	8-2/MTR NO	YES NO	
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE OUTLET PRESSURE OF THE BOOSTER CONTROL REGULATOR INDICATED APPROXIMATELY 800 PSIG WHERE SPECIFIED LIMITS ARE 725 TO 775 PSIG. THIS PROBLEM HAS BEEN ATTRIBUTED TO A MALFUNCTION IN THE REGULATOR ALTHOUGH AN INSTRUMENTATION MALFUNCTION IS A POSSIBILITY.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE. THE LOWER PRESSURE WAS APPARENTLY SUFFICIENT TO PERFORM ALL REQUIRED FUNCTIONS WITH NO DISCERNIBLE EFFECTS.</p> <p>CORRECTIVE ACTION-NONE.</p>						

GENERAL DYNAMICS  
CONVAIR DIVISION

16 JUN 1966

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	DATE TIME DIF	PKI OTM	VENDOR NAME VENDOR PART NO
PROPULSION-NAE-A/B BOOSTER	AES2-0317/83-401-00-127 BOOSTER CONTROL PNEUMATIC REGULATOR	FLIGHT	1270 820511	9-3/MTR 0	YES NO	YES ROCKETDOME
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE OUTLET PRESSURE OF THE BOOSTER CONTROL REGULATOR INDICATED 725 PSIG AT LIFTOFF AND 720 AT BOOSTER CUTOFF. SPECIFIED LIMITS ARE 725 TO 775 PSIG.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE. THE PRESSURE SUPPLIED WAS APPARENTLY SUFFICIENT TO PERFORM ALL REQUIRED FUNCTIONS.</p> <p>CORRECTIVE ACTION-NONE.</p>						
PROPULSION-NAE-A/B BOOSTER	AES2-0317/82-401-00-124 PUMP-TURBO	FLIGHT	1340 820523	9-2/MTR 110	YES NO	YES
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. AT 110.5 SECONDS, THE B1 PUMP SPEED DROPPED FROM 5,977 TO 5,942 RPM. POSSIBLE CAUSES INCLUDE-1) EXCESSIVE HEATING OF THE 866 REFERENCE REGULATOR, 2) DECAY IN BOOSTER CONTROL PRESSURE DOWNSTREAM OF REGULATOR, 3) LEAK IN DUCT BETWEEN 66 AND B1 TURBINE INLET AND 4) UNKNOWN MINOR PROBLEM WITH 866 LOX REGULATOR.</p> <p>SYSTEM EFFECT-ERRATIC OPERATION. DROP IN PUMP SPEED APPARENTLY RESULTED IN 6 PSI DROP AND RECOVERY OF B2 CHAMBER PRESSURE BETWEEN 112 AND 115 SECONDS. B1 CHAMBER PRESSURE DATA WAS INVALID.</p> <p>VEHICLE EFFECT-NONE. NO DETRIMENTAL EFFECT ON OVER-ALL ENGINE PERFORMANCE. RE-ENTRY VEHICLE IMPACT WAS SATISFACTORY.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-NAE-A/B BOOSTER	AES2-0211/83-401-00-32 GAS GENERATOR	FLIGHT	520 820221	9-3/MTR 10	YES YES	YES ROCKETDOME
<p>FAILURE MODE-LEAK-EXTERNAL-THERE WAS A HOT GAS LEAK IN THE BOOSTER GAS GENERATOR OR ITS DISCHARGE DUCT THAT WAS EVIDENT AT 16 SECONDS AND MAY HAVE BEGUN AT ENGINE START.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY-THE HOT GAS LEAK CAUSED A HIGH TEMPERATURE CONDITION IN THE ENGINE COMPARTMENT WHICH RESULTED IN PREMATURE SHUTDOWN OF THE SUBSTAINER/VERNIER ENGINES AT 49 SECONDS AND THE BOOSTER ENGINE AT 60 SECONDS.</p> <p>VEHICLE EFFECT-IMMEDIATE DESTRUCT-THE PROPULSION SYSTEM FAILURE RESULTED IN VEHICLE SELF DESTRUCTION AT 71 SECONDS.</p> <p>CORRECTIVE ACTION-NONE.</p>						

13 JUN 1966

GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MA2-A/B BOOSTER	A480-0189/GDA P1-402-00-91 ROUGH COMBUSTION	COUNTDOWN	910 601815	18/ETR -90	YES NO		003433
FAILURE MODE-PREMIATURE OPERATION. GENERATED RCC FROM BOOSTER SYSTEM PRIOR TO ENGINE START.							
SYSTEM EFFECT-IMPROPER DISCRETE SIGNAL.							
VEHICLE EFFECT-COUNTDOWN DELAYED.							
CORRECTIVE ACTION-UNKNOWN. SYSTEM DISABLED.							
PROPULSION-MA2-A/B BOOSTER	A480-0541/P1-402-01-71 PUMP-TURBO	FLIGHT	710 601013	11/ETR 139.5	YES NO	YES ROCKETDYNE	007505
FAILURE MODE-CUT OF EXPECTED TEST VALUE. B1 PUMP SPEED BEGAN AN ERRATIC INCREASE FROM 6111 RPM AT 139.5 SECONDS TO A PEAK OF 6260 RPM AT 139.4 SECONDS. CHAMBER PRESSURE DECAVED TO 474 PSIA OVER THE SAME INTERVAL. PROBABLY CAUSED BY A PARTIAL OBSTRUCTION IN THE LOW LINE UPSTREAM OF THE STAGING VALVE.							
SYSTEM EFFECT-OPERATION TOO LOW. B1 CHAMBER PRESSURE DECREASED TO 474 PSIA AT 139.2 SECONDS RESULTING IN THRUST DEC AT. DEVIATIONS IN TAN RATE AND ENGINE POSITION SIGNALS WERE OBSERVED.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE.							
PROPULSION-MA2-A/B BOOSTER	A480-0118/P1-401-00-71 SWITCH-RCC	COUNTDOWN	710 601007	11/ETR -140	NO NO		007603
FAILURE MODE-PREMIATURE OPERATION. B1 BACKUP ROUGH COMBUSTION CUTOFF TEST SWITCH WAS INADVERTANTLY ACTIVATED CAUSING ENGINE CUTOFF.							
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS. ENGINE CUTOFF WAS RECEIVED DUE TO INADVERTANT RCC TEST SWITCH ACTIVATION.							
VEHICLE EFFECT-COUNTDOWN DELAYED AND RECYCLED TO 1-7 MINUTES.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-MA2-A/B BOOSTER	A480-0048 BOOSTER 1 CHAMBER PRESSURE SWITCH P8110-490	COUNTDOWN	330 600983	18/ETR -90	YES NO	YES ROCKETDYNE	
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. BOOSTER CHAMBER PRESSURE SWITCH DID NOT PICK UP AFTER TRANSITION 7 O MAINTAGAC.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. ENGINE SHUTDOWN WAS EFFECTED.							

15 JUN 1966

GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PR1 OTM	VENDOR NAME VENDOR PART NO	
	VEHICLE EFFECT-PREATURE PROPULSION CUTOFF. VEHICLE INTEGRITY WAS MAINTAINED SINCE LIFTOFF HAD NOT OCCURRED.						006731
	CORRECTIVE ACTION-THE PRESSURE SWITCH WAS REMOVED AND REPLACED WITH A LIKE UNIT.						
PROPULSION-WA2-A/B BOOSTER	AD60-0039/0A230/LI-403-00-87 BOOSTER LOX REF RES	PRF	970 005623	PALC/1-1	YES NO	ROCKETDYNE	003643
	FAILURE MODE-ERRATIC OPERATION. BOOSTER LOX REFERENCE REGULATOR OSCILLATED 8 PSI6 PEAR-TO-PEAK DURING TEST. CAUSE UNKNOWN.						
	SYSTEM EFFECT-NONE. FIRING SUCCESSFUL.						
	VEHICLE EFFECT-NONE. PRF SUCCESSFUL. REGULATOR CHANGED PRIOR TO FLIGHT.						
	CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-WA2-A/B BOOSTER	AD60-0031/0A226/LI-401-00-87 IGNITER	PRF	970 000919	PALC/1-1	YES NO	ROCKETDYNE	003644
	FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. BE IGNITER FAILED TO FIRE. CAUSE UNKNOWN.						
	SYSTEM EFFECT-OPERATION DOES NOT START. B1 ENGINE DID NOT START.						
	VEHICLE EFFECT-COUNTDOWN ABORTED AND RE-SCHEDULED. PRF ABORTED.						
	CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-WA2-A/B BOOSTER	A2C-87-180/CONVAIRPM-401-00-48 THRUST CHAMBER	FLIGHT	440 000407	11/ETR 1.29	YES NO	ROCKETDYNE	007360
	FAILURE MODE-FAILED DURING OPERATION. ABNORMAL BE THRUST CHAMBER PRESSURES WERE INDICATED STARTING 1.29 SECONDS AFT ER SUSTAINER FLIGHT LOCKIN. AT THIS TIME THE PRESSURE ROSE AND DROPPED OFF APPROXIMATELY 10 PCT. STARTING AT 1.31 SECONDS THE PRESSURE ROSE GRADUALLY UNTIL AN EXPLOSION OCCURRED AT 1.60 SECONDS.						
	SYSTEM EFFECT-EXPLOSION. A BE THRUST CHAMBER PRESSURE DISTURBANCE STARTING 1.29 SECONDS RESULTED IN A MAJOR ENGINE EXPLOSION AT 1.6 SECONDS.						
	VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. FAILURE OF THE BOOSTER PROPULSION SYSTEM RESULTED IN COMPLETE LOSS OF THE VEHICLE DUE TO EXPLOSION. 90.89 SECONDS AFTER SUSTAINER FLIGHT LOCKIN.						
	CORRECTIVE ACTION-SPECIAL PROPULSION SYSTEM LANDLINE INSTRUMENTATION WAS PROVIDED TO MONITOR THE LAUNCHING OF FUTURE VEHICLES TO INSURE ADEQUATE DATA FOR SYSTEM ANALYSIS. REDESIGNED BOOSTER INJECTORS WERE LATER INCORPORATED.						
							PAGE 0008

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE OF	SITE TIME OF	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MA2-A/B BOOSTER	A2C-27-121P3-401-00-01 THRUST CHAMBER	FLIGHT	510 800310	19/ETR -2.0	YES NO	065167
FAILURE MODE-FAIL DURING OPERATION. COMBUSTION INSTABILITY IN THE B1 THRUST CHAMBER.						
SYSTEM EFFECT-EXPLOSION. LOW ORDER EXPLOSION IN THE INJECTOR AREA. SYSTEM INTEGRITY WAS LOST.						
VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. THRUST SECTION DESTROYED BY EXPLOSION AT 2.3 SECONDS AND VEHICLE DESTROYED AT 5.2 SECONDS.						
CORRECTIVE ACTION-AS A RESULT OF THIS AND OTHER COMBUSTION INSTABILITY PROBLEMS, BAPPED INJECTORS WERE DEVELOPED AND PUT INTO USE.						
PROPULSION-MA2-A/B BOOSTER	FTA 0500/P1-402-00-42 B1 MAIN FUEL VALVE	PRP	420 800223	11/ETR	YES NO	001674
FAILURE MODE-INTERNAL LEAK. SLIGHT LEAKAGE AT B1 MAIN FUEL VALVE CAUSED A FIRE IN THE FLAME BUCKET AFTER CUTOFF, NO DAMAGE INCURRED.						
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. SLIGHT LEAKAGE AT B1 MAIN FUEL VALVE CAUSED A FIRE IN THE FLAME BUCKET AFTER CUTOFF. NO DAMAGE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-REPLACE B1 MAIN FUEL VALVE.						
PROPULSION-MA2-A/B BOOSTER	DA163/B2-400-10-25 IGNITER LINK	COMPOSITE-FIB/DPL	250 800210	9-2/ETR	YES NO	004778
FAILURE MODE-ELECTRICAL OPEN. DURING COMMIT SEQUENCE A FAIL INDICATION WAS RECEIVED DURING THE IGNITER LINKS CONTINUITY CHECK. PROBLEM WAS DUE AN OPEN B1 IGNITER LINK.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.						
VEHICLE EFFECT-COMMIT SEQUENCE AND COUNTDOWN ABORTED.						
CORRECTIVE ACTION-REPLACED IGNITER.						
PROPULSION-MA2-A/B BOOSTER	FTA601/00A19-401-00-49 DETECTOR LINK	COUNTDOWN	490 800209	19/ETR -2.	YES NO	
FAILURE MODE-FAIL DURING OPERATION. ENGINE CUTOFF FROM IGNITION STAGE LIMITER WHEN BE IGNITION DETECTOR LINKS BURNED BUT REMAINED FUSED.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY ENGINE CUTOFF FROM IGNITION STAGE LIMITER.						

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## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED.							007937
CORRECTIVE ACTION-NONE.							
PROPULSION-MAS-A/B BOOSTER	FTAB90/PI-401-00-42 B1 FUEL VALVE	PRF	420 800204	11/ETR	YES NO		001072
FAILURE MODE-INTERNAL LEAK. POST TEST INVESTIGATION REVEALED A SLIGHT FUEL LEAK AT THE B1 MAIN FUEL VALVE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPLACE B1 FUEL VALVE.							
PROPULSION-MAS-A/B BOOSTER	DA157/A3-402-00-04 DETECTOR LINK CONNECTOR	COUNTDOWN	80 800125	A-2/ETR	YES NO		006787
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME-DURING COMMIT SEQUENCE A FAIL INDICATION WAS RECEIVED DURING B2 IGNITION DETECTOR LINK CONTINUITY CHECK. PROBLEM DUE TO A LOOSE DETECTOR LINK CONNECTOR.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.							
VEHICLE EFFECT-COMMIT SEQUENCE AND COUNTDOWN ABORTED.							
CORRECTIVE ACTION-CONNECTOR REPLACED.							
PROPULSION-MAS-A/B BOOSTER	FTAB99/PS-400-01-44 MAIN LOZ VALVE	COMPOSITE-B FACT	440 800115	13/ETR 0	YES NO		005406
FAILURE MODE-OUT OF SPECIFICATION. THE B1 AND B2 MAIN LOZ VALVES WERE BOTH 20 MILLISECONDS TOO FAST IN REACHING THE FULL OPEN POSITION AFTER RECEIVING THE OPENING CONTROL SIGNAL.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NO ACTION TAKEN AS DEVIATION FROM SPECIFICATION WAS SO SMALL THAT IT DID NOT WARRANT A CHANGE IN VALVE TIMING.							
PROPULSION-MAS-A/B BOOSTER	AC00-0001/SL-410-C8-36 LOZ BOMB CARBETS	CAPTIVE	360 800108	B1/STC	YES NO	YES ROCKETDYNE	
FAILURE MODE-OUT OF EXPECTED TEST VALUE. B2 IGNITER VALVE AMBIENT TEMPERATURE INDICATED A MINIMUM OF MINUS 200 DEG. F DURING THE BOOSTER PHASE. POST TEST INVESTIGATION REVEALED A POSSIBLE LOZ LEAK SOURCE AT THE TWO B2 THROTTLECHAMBER INNER LOZ BOMB BOLTS NEAREST THE B2 IGNITER VALVE. THIS LEAK WAS ALSO EVIDENCED DURING TESTS 487 AND 489.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PSI OTH	VENDOR NAME VENDOR PART NO	
SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-THE NINE DONE TO IGNITER MOUNTING BOLT GASKETS WERE REPLACED AND A DYE-PENETRANT CHECK OF THE BOLT GASKETS WAS SATISFACTORY.							000000
PROPULSION-WA2-A/B BOOSTER	A2C-27-080/P4-401-00-80 B66 LOX REFERENCE REGULATOR	FLIGHT	200 901120	14/ETR -3.1	YES NO	ROCKETDYNE	004787
FAILURE MODE-ERRATIC OPERATION. B66 LOX REFERENCE REGULATOR PRESSURE DECREASED ABNORMALLY AT -3.1 SECONDS FROM 975 PSIA TO 445 PSIA AND RECOVERED TO REQUIRED LEVEL OF 375 PSIA 5.7 SECONDS LATER. CAUSE UNKNOWN. SYSTEM EFFECT-OPERATION TOO LOW. ABNORMAL REGULATOR BEHAVIOR RESULTED IN REDUCTION OF BOOSTER ENGINES POWER LEVEL DURING HOLDDOWN AND THE FIRST THREE SECONDS OF FLIGHT. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-NONE.							000001
PROPULSION-WA2-A/B BOOSTER	32-410-C7-24 B1 MAIN LOX VALVE	CAPTIVE	240 901015	9-2/3YC 0.31	YES NO		000001
FAILURE MODE-OUT OF SPECIFICATION. THE B1 MAIN LOX VALVE OPENED IN LESS THAN 0.340 SECONDS, THE MINIMUM OPENING SPEC C. ALSO, THE CLOSING TIME WAS UNDER THE MINIMUM SPECIFICATION. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-UNKNOWN.							000001
PROPULSION-WA2-A/B BOOSTER	82-404-84-24 THRUST CHAMBER	CAPTIVE	240 900810	92/3YC	NO NO	ROCKETDYNE	000073
FAILURE MODE-OUT OF SPECIFICATION. LACK OF EXTERNAL BOOSTER CHAMBER COOLANT WATER FLOW DURING SUSTAINER STAGE RESULTED IN OVERHEATING OF THE CHAMBERS. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-BOTH BOOSTER CHAMBERS REPLACED.							000001

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-NA2-A/B BOOSTER	SI-419-C7-09 B1 LUBE OIL SENSE LINE	CAPTIVE	90 990903	81/8YC	YES NO	090655
FAILURE MODE-FAIL TO OPERATED AT PRESCRIBED TIME. B1 NUMBER 3 BEARING LUBE OIL NOZZLE PRESSURE DIP NOT FINE ADJUST 8 PSI6 DURING RUN. POSSIBLY CAUSED BY FROZEN SENSE LINE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-PURGED LUBE OIL SYSTEM.						
PROPULSION-NA2-A/B BOOSTER	FTAB131/P3-402-00-17 DETECTOR LINKS, CONNECTOR	PRP	170 990909	13/ETR -540	NO NO	093264
FAILURE MODE-PREATURE OPERATION. B1 DETECTOR LINK PANEL LIGHTS WERE LOST DUE TO A LOOSE PLUG.						
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS.						
VEHICLE EFFECT-COUNTDOWN DELAYED. 12 MINUTES HOLD.						
CORRECTIVE ACTION-RECONNECTED PLUG.						
PROPULSION-NA2-A/B BOOSTER	SI-409-84-09 B LUBE OIL DISCHARGE LINE	CAPTIVE	90 990904	81/8YC	YES NO	094964
FAILURE MODE-STRUCTURAL. WEAR HOLE RESULTED FROM INTERFERENCE WITH LOX TANK PRESSURIZATION DUCT CLAMP BOLT. DISCOVERED DURING POST TEST INSPECTION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-ADJUST CLAMP TO KEEP LINE AWAY FROM PRESSURIZATION DUCT. REPLACE LUBE OIL DISCHARGE LINE.						
PROPULSION-NA2-A/B BOOSTER	EN132/P4-402-00-10 BOOSTER IGNITER FUEL POPPET	PRP	100 990903	14/ETR	YES NO	090655
FAILURE MODE-STRUCTURAL. DURING FLIGHT READINESS FIRING TEST TWO FUEL POPPETS FELL OUT OF THE B2 CHAMBER. ONE POPPET FELL OUT OF THE B1 CHAMBER DURING POST TEST INSPECTION.						
SYSTEM EFFECT-NONE. IGNITION SYSTEM PERFORMED SATISFACTORILY, PROVIDING PROPER IGNITION STAGE BURNING.						
VEHICLE EFFECT-NONE. VEHICLE RESPONDED NORMALLY THROUGHOUT THE FLIGHT READINESS FIRING. WITHOUT EFFECT FROM THE POPPET DROP-OUT.						

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SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PHI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-POPPETS REPLACED BEFORE FLIGHT TEST.							993012
PROPULSION-WA2-A/B BOOSTER	91-413-C6-09 BOOSTER LUBE OIL PUMP	CAPTIVE	90 990901	81/8YC	YES	ROCKETDYNE	999716
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. B1 LUBE OIL PRESSURE RISE WAS ABNORMALLY SLOW. LUBE OIL WAS PARTIALLY BYPASSING THE PUMP BEARS. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-PRESSURIZE LUBE OIL TANK AT A SLOWER RATE.							
PROPULSION-WA2-A/B BOOSTER	EM330/P4-401-00-10 IGNITER FUEL POPPET, BOOSTER-B1	PHF	100 990901	14/ETR 0	YES	ROCKETDYNE	993393
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. BOOSTER (B1) IGNITER FUEL POPPET FAILED TO OPERATE PROPERLY STARTING THE ENGINE OF IGNITER FUEL. SYSTEM EFFECT-OPERATION TOO LOW. BOOSTER ENGINE (B1) FAILED TO REACH PROPER IGNITION DUE TO FUEL STARVATION. VEHICLE EFFECT-PRIMAURE PROPULSION SHUTDOWN. THE PROPULSION SYSTEM SHUT DOWN AUTOMATICALLY AT 2.43 SECONDS DUE TO IMPROPER BOOSTER IGNITION.							
CORRECTIVE ACTION-BOOSTER FUEL IGNITER POPPET REPLACED WITH B MODIFICATION POPPET TO IMPROVE IGNITION.							
PROPULSION-WA2-A/B BOOSTER	A2C-27-977/P4-401-00-10 POPPET/B1 IGNITER FUEL	PHF	100 990901	14/ETR NO	YES	ROCKETDYNE	992853
FAILURE MODE-ERRATIC OPERATION. THE B1 IGNITER FUEL POPPET RESTRICTED FLOW TO THE B1 ENGINE. SYSTEM EFFECT-OPERATION STOPS PREMATURELY. ENGINE CUTOFF OCCURRED DURING IGNITION STAGE BECAUSE OF INSUFFICIENT IGNITER FUEL SUPPLY. VEHICLE EFFECT-PRIMAURE PROPULSION CUTOFF. ENGINE CUTOFF WAS PREMATURE AND THE FLIGHT READINESS FIRING (PRF) TEST WAS UNSATISFACTORY.							
CORRECTIVE ACTION-THE POPPET WAS REPLACED AND A SUBSEQUENT TEST ON 5 SEPTEMBER 1959 WAS SUCCESSFUL. IGNITER FUEL POPPET WAS ULTIMATELY REMOVED FROM ATLAS VEHICLES.							
PROPULSION-WA2-A/B BOOSTER	91-410-95-09 B1 THRUST CHAMBER	CAPTIVE	90 990818	81/8YC	YES	ROCKETDYNE	
FAILURE MODE-OUT OF SPECIFICATION. B1 IGNITER FIRED HOWEVER THE IGNITION DETECTOR LINE DID NOT BREAK. SPECIAL IGNITER FUEL BLOWDOWN TESTS REVEALED THAT THE B1 IGNITER FUEL FLOW WAS BELOW THE MINIMUM 1.8 LBS/SEC. FLOW.							

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PHI OTH	VENDOR NAME VENDOR PART NO	
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY. IGNITION STAGE TIMER CUTOFF WHEN THE IGNITION DETECTOR LINK DID NOT BREAK.						094949
	VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF.						
	CORRECTIVE ACTION-THRUST CHAMBER WAS REPLACED.						
PROPULSION-MA2-A/B BOOSTER	31-408-85-09 B1 THRUST CHAMBER	CAPTIVE	90 590817	91/8YC	YES NO	ROCKETDYNE 200351-4030	094948
	FAILURE MODE-OUT OF SPECIFICATION. B1 IGNITER FIRED HOWEVER THE IGNITION DETECTOR LINK DID NOT BREAK. SPECIAL LIMITER FUEL BLOWDOWN TESTS REVEALED THAT B1 IGNITER FUEL FLOW WAS BELOW THE MINIMUM 1.5 LC/SEC. FLOW. THIS WAS DISCOVERED AFTER RUN 410.						
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY. IGNITION STAGE TIMER CUTOFF WHEN THE IGNITION DETECTOR LINK DID NOT BREAK.						
	VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF.						
	CORRECTIVE ACTION-THRUST CHAMBER WAS REPLACED AFTER RUN 410.						
PROPULSION-MA2-A/B BOOSTER	31-408-84-08 B2 THRUST CHAMBER INJECTOR	CAPTIVE	90 590804	91/8YC	YES NO	ROCKETDYNE	094950
	FAILURE MODE-FAIL DURING OPERATION. FOUR BURN AREAS ON INJECTOR DISCOVERED DURING POST TEST INSPECTION.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-REPLACE ENGINE.						
PROPULSION-MA2-A/B BOOSTER	D454/B1-48M-06-08 BOOSTER CONTROL REGULATOR	COMPOSITE-PRO/DPL	00 590718	A-2/MTR	YES NO	ROCKETDYNE	094958
	FAILURE MODE-DRIFT-REGULATOR PRESSURE DRIFTED DOWN DURING THE COUNTDOWN. ALSO, A SPIKE WAS NOTED DURING HELIUM VENT						
	SYSTEM EFFECT-OPERATION TOO LOW DUE TO IMPROPER PRESSURE SUPPLY TO BOOSTER ENGINE PNEUMATIC SYSTEM.						
	VEHICLE EFFECT-DPL WAS ABORTED AND RESCHEDULED.						
	CORRECTIVE ACTION-UNKNOWN.						

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**RESEARCH**

**UNITED STATES DEPARTMENT OF JUSTICE**

SYSTEM NO-PROB	TEST REPORT NUMBER PLATE COMPONENT NAME	DOT IN 20 BOMB PART NUMBER	VEHICLE DATE DOT	LIVE TIME DOT	PTS DOT	VEHICLE NAME DOT
PROPULSION-ME-LA BOOSTER	PRIME 1471-147-01-11 PRESSURE ME TOR	DOT	112 990734	11/27/74 PLUG 1	YES NO	VEHICLE NAME DOT
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. BE FOR. BOOSTER PRESSURE ME TOR ON TENDED DISPLAY AT EXPECTED ACT GATED TIME DOT WAS NOT BEING ACTIVATED.						
SYSTEM EFFECT-NONE. WOULD HAVE CRACKED - WERE SHUTDOWN IF OPERATION WAS CONTINUED. PROBABLY SHUTDOWN WAS ALREADY BECAUSE FOR OTHER REASONS.						
VEHICLE EFFECT-NONE.						
CONNECTIVE ACTION-REPAIR TUBES.						
PROPULSION-ME-LA BOOSTER	ME-407-147-01 BE TUBES CRACKED TIME	CAPTIVE	NO 990733	21/27/74 NO	YES NO	VEHICLE NAME DOT
FAILURE MODE-STRUCTURAL. SIX SIXTY COOLER TUBES. DISCOVERED DURING POST TEST INSPECTION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CONNECTIVE ACTION-REPAIR TUBES.						
PROPULSION-ME-LA BOOSTER	ME-407-147-01 BOOSTER LINE OIL PUMP	CAPTIVE	NO 990702	21/27/74 1.5	YES NO	VEHICLE NAME DOT
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME -44 LINE OIL PRESSURE RISE WAS ABNORMALLY SLOW. OIL WAS SLURRY AND HAD THE PUMP SEIZURE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE. THE LINE WAS EXTENDED.						
CONNECTIVE ACTION-PREPARATE THE BOOSTER LINE OIL TANK AT SLOWER RATE.						
PROPULSION-ME-LA BOOSTER	ME-407-147-01 BE TUBES CRACKED TIME	CAPTIVE	NO 990702	21/27/74 NO	YES NO	VEHICLE NAME DOT
FAILURE MODE-STRUCTURAL. FIVE TUBES CRACKED AND SEVEN TUBES DEFORMATIONS. DISCOVERED DURING POST TEST INSPECTION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CONNECTIVE ACTION-REPAIR TUBES.						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-WAL-A/B BOOSTER	B1-400-A2-08 B2 THRUST CHAMBER TUBE	CAPTIVE	90 990702	81/8YC	YES	ROCKETDYNE	899830
FAILURE MODE-STRUCTURAL. ONE CRACKED TUBE IN B2 CHAMBER WAS REVEALED DURING POST TEST INSPECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPAIR TUBE.							
PROPULSION-WAL-A/B BOOSTER	A2C-27-072/52-414-C3-02 B2 THRUST CHAMBER	CAPTIVE	20 990823	82/8YC 39.44	YES	ROCKETDYNE	899060
FAILURE MODE-FAIL DURING OPERATION-B1 THRUST CHAMBER COMBUSTION PROCESS BECAME UNSTABLE RESULTING IN A GRADUAL DETE RIORATION OF THE INJECTOR PLATE AT 39.44 SECONDS.							
SYSTEM EFFECT-EXPLOSION-OBSERVER CUTOFF OCCURRED AT 42.06 SECONDS AS A RESULT OF AN OBSERVED FIRE IN THE THRUST SEC TION. THIS WAS FOLLOWED BY AN EXPLOSION.							
VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. THE VEHICLE AND STAND WERE DESTROYED.							
CORRECTIVE ACTION-MODIFY FTRER SYSTEM FOR BETTER EFFECTIVITY. PROVIDE RELIABLE MEANS OF OPERATING CRITICAL VALVES F ROM THE BLOCKHOUSE. USE MORE RELIABLE RCC ACCELEROMETER CRYSTALS.							
PROPULSION-WAL-A/B BOOSTER	B1-403-A2-09 LUBE OIL PUMP	CAPTIVE	90 990809	81/8YC 5.	YES	ROCKETDYNE	899830
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME- B1 LUBE OIL PRESSURE RISE WAS TOO SLOW AND MINIMUM REDLINE VALUE N OT ACHIEVED.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-PROXIMATE PROPULSION CUTOFF- OBSERVER CUTOFF WHEN LUBE OIL PRESSURE WAS OUT OF REDLINE LIMITS.							
CORRECTIVE ACTION-REDLINE WAS MODIFIED TO EXTEND TIME LIMIT FOR PRESSURE RISE.							
PROPULSION-WAL-A/B BOOSTER	B1-403-A1-08 B1 THRUST CHAMBER TUBES	CAPTIVE	90 990327	81/8YC	YES	ROCKETDYNE	
FAILURE MODE-FAILURE DURING OPERATION-ONE B1 THRUST CHAMBER TUBE RUPTURED. FOUND DURING POST TEST INSPECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-REPAIR.							099713
PROPULSION-WA2-A/B BOOSTER	31-402-A1-06 LUBE OIL PUMP	CAPTIVE	90 900327	81/8YC	YES NO	YES ROCKETDYNE	099649
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. B1 LUBE OIL PRESSURE RISE WAS ABNORMALLY SLOW. SLOW PRESSURE RISE WAS DUE TO CONFIGURATION OF OIL PUMP.  SYSTEM EFFECT-NONE.  VEHICLE EFFECT-NONE.  CORRECTIVE ACTION-PRESSURIZE THE BOOSTER LUBE OIL TANK AT A SLOWER RATE.							099633
PROPULSION-WA2-A/B BOOSTER	32-409-B1-02 THRUST CHAMBER TUBES	CAPTIVE	20 900322	82/8YC	YES NO	YES ROCKETDYNE	099633
FAILURE MODE-FAIL DURING OPERATION. POST RUN INSPECTION REVEALED TUBE RUPTURES IN THE B1 AND B2 CHAMBERS.  SYSTEM EFFECT-NONE.  VEHICLE EFFECT-NONE.  CORRECTIVE ACTION-REPLACED TUBES.							099632
PROPULSION-WA2-A/B BOOSTER	32-407-A1-02 BOOSTER LUBE OIL PUMP	CAPTIVE	20 900430	82/8YC	YES NO	YES ROCKETDYNE	099632
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. LUBE OIL PRESSURE FAILED TO RISE ABOVE THE LOWER REDLINE LIMIT.  SYSTEM EFFECT-OPERATION STOPS PREMATURELY. OBSERVER CUTOFF.  VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. OBSERVER CUT OFF WHEN REDLINE WAS VIOLATED.  CORRECTIVE ACTION-PRESSURIZE LUBE OIL TANK AT SLOWER RATE.							099632
PROPULSION-WA2-A/B BOOSTER	PTA4757/P3-402-00-03 BOOSTER IGNITER PLUGS	COUNTDOWN	30 900414	13/ETH -480C	NO NO	NO ROCKETDYNE	099632
FAILURE MODE-CONTAMINATION-IGNITER PLUGS IN BOOSTER CHAMBERS WERE BEING SPRAYED BY LUBE DISPERSAL WATER DURING LINE L OASING DUE TO BLOWING (END).  SYSTEM EFFECT-CONTAMINATION-BOOSTER CHAMBERS AND IGNITERS WERE SPRAYED WITH LUBE DISPERSAL WATER.  VEHICLE EFFECT-COUNTDOWN DELAYED. 18 MINUTE HOLD.							099632

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VEHICLE NAME VENDOR PART NO
CORRECTIVE ACTION-IGNITER CONNECTOR PLUGS COVERED WITH VINYL TAPE TO PROTECT IGNITER DETECTOR CIRCUITRY.						
PROPULSION-WAS-A/B BOOSTER	SE-402-A1-02 BOOSTER LUBE OIL SYSTEM PUMP	CAPTIVE	ED 990319	SE/STC 4.1	YES NO	YES ROCKETDYNE M <sup>o</sup>
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. LUBE OIL PRESSURE REQUIRED 4.1 SECONDS TO ATTAIN OPERATING LEVEL. NORMAL TIME IS 1.3 SECONDS.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-PRESSURIZE LUBE OIL TANK BLOWER.						
PROPULSION-WAS-A/B BOOSTER	SE-402-A1-02 DE TURBO PUMP ACCESSORY PAD SEAL	CAPTIVE	ED 990319	SE/STC	YES NO	YES NO
FAILURE MODE-LEAK, EXTERNAL. POST TEST INSPECTION REVEALED LUBE OIL LEAKAGE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-REPLACE SEAL.						
PROPULSION-WAS-A/B BOOSTER	14-424-B1-90 B1 MAIN FUEL VALVE	CAPTIVE	990304	1-4/EDNA RDB	YES NO	YES ROCKETDYNE NO
FAILURE MODE-LEAK-INTERNAL. POST TEST INSPECTION REVEALED A LEAK IN THE B1 FUEL VALVE. THE CAUSE IS UNKNOWN.						
SYSTEM EFFECT-NONE. OPERATION WAS SATISFACTORY THROUGHOUT THE TEST.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE VALVE WAS REPLACED.						
PROPULSION-WAS-A/B BOOSTER	B1-409-A2-09 THRUST CHAMBER INJECTOR	CAPTIVE	90 990207	B1/STC 0.74	YES NO	YES ROCKETDYNE NO
FAILURE MODE-CONTAMINATION. OSCILLATIONS OF 100 CPS WERE NOTED ON B2 FUEL INJECTION PRESSURE DATA. THIS BUZZING IS ATTRIBUTED TO RESONANT PUMPING PLUGS MIXING WITH LITHIUM CHLORIDE.						
SYSTEM EFFECT-ERRATIC OPERATION.						
VEHICLE EFFECT-NONE.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-NONE.							394957
PROPULSION-WA2-A/B BOOSTER	91-407-A3-09 B1 THRUST CHAMBER TUBE	CAPTIVE	BA	BYCAMONE	YES	ROCKETDYNE NO	994960
FAILURE MODE-STRUCTURAL. ONE SPLIT COOLANT TUBE. DISCOVERED DURING POST TEST INSPECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPLACE THRUST CHAMBER.							
PROPULSION-WA2-A/B SUSTAINER	574-S-06-37 REGULATOR-GAS	FLIGHT	720 990330	ABREMB-3 RECO	YES YES	N/A	990396
FAILURE MODE-SUSTAINER LOX REG REFERENCE PRESSURE INDICATED AN ABNORMAL TRANSIENT AT BECO AND A DECAY DURING THE VE ENTER SOLO PHASE. INSUFFICIENT DATA PRECLUDES RESOLUTION AS TO EXACT FAILURE MODE AND CAUSE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE PLANNED.							
PROPULSION-WA2-A/B SUSTAINER	574-S-06-15 REGULATOR-GAS	FLIGHT	980 990211	ABREMB-2 -1	YES NO	N/A	990402
FAILURE MODE-SUSTAINER LOX REG REFERENCE PRESSURE WAS SLOW TO RECOVER FROM THE ENGINE START TRANSIENT. RECOVERY TIM E WAS 1.0 SECONDS INSTEAD OF 0.4 SECONDS.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE-THIS PROBLEM IS NOT CONSIDERED CRITICAL OR IN NEED OF CORRECTIVE ACTION.							
PROPULSION-WA2-A/B SUSTAINER	92-440-02-05 LOX REGULATOR	COMPOSITE-PRD/DPL	950 931210	92/MTN	YES NO	ROCKETDYNE	
FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE SUSTAINER LOX REGULATOR REFERENCE PRESSURE WAS APPROXIMATELY 18 PSI LO WER THAN THE SET LEVEL. ALTHOUGH REGULATOR OUTPUT PRESSURES ARE NORMALLY TEMPERATURE AND PRESSURE SENSITIVE, IT WAS FELT THAT A 18 PSI DIFFERENTIAL WAS NOT ACCEPTABLE.							
SYSTEM EFFECT-NONE.							

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CONVAIR DIVISION

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE REGULATOR WAS CHANGED PRIOR TO FLIGHT.						
PROPULSION-WAZ-A/B SUSTAINER	SDC-AP263-007/83-401-00-172 PROPELLANT UTILIZATION VALVE	FLIGHT	1720 890121	8-3/MTR 291.00	YES NO	
FAILURE MODE-OUT OF TOLERANCE. PU VALVE (FUEL VALVE) VS. MIXTURE RATIO WAS NOT RE-CALIBRATED AFTER ENGINE COMPONENT CHANGES WERE MADE. THIS WAS A FIRED PU VALVE FLIGHT. THE ERRONEOUS PU VALVE FIRED POSITION RESULTED IN EXCESSIVE FUEL FLOW.						
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY-PREATURE FUEL DEPLETION OF MAIN PROPELLANT RESULTING IN FUEL STARVATION OF F SUSTAINER THRUST CHAMBER AND GAS GEN. WITH PROBABLE RUPTURE OF FUEL BOOSTRAP LINE PREVENTING GAS GENERATOR FROM RE-VENTING TO TANK-FED OPERATION ALLOWING FUEL FROM ENGINE TANK TO BE EXHAUSTED OUT OF RUPTURED LINE. THIS RESULTED IN PRE-MATURE VERNIER SHUTDOWN.						
VEHICLE EFFECT-PREATURE FROMULSION SHUTDOWN. SUSTAINER SHUTDOWN 1.35 SEC. PRIOR TO COMMAND. VERNIER ENGINES SHUTDO WN PREMATUURELY 7.32 SEC AFTER SUSTAINER SHUTDOWN.						
CORRECTIVE ACTION-SD/C TO INSURE ONLY CURRENT VALIDATED DATA IS USED FOR P.U. VALVE SETTING CALCULATIONS ON FUTURE FLIGHTS. FLIGHT INSTRUMENTATION ADDED TO PERMIT POST FLIGHT DETERMINATION OF PROPELLANT USAGE FOR COMPARISON WITH PRE-FLIGHT PREDICTIONS.						
PROPULSION-WAZ-A/B SUSTAINER	SD/CZ2M64-029-DA1022-7/A-7HO-01-71 OR DUCT, TRANSDUCER BOSS	COMPOSITE-FRD/DPL 07-23203-021	7102 840921	2-4	YES NO	YES 228
FAILURE MODE-STRUCTURAL. POST DPL INSPECTION SHOWED A CRACK AT THE P10217 (LO2 BREAKAWAY VALVE TEMPERATURE) INSTRUM ENTATION BOSS ON THE Y-DUCT.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-THE Y-DUCT REQUIRED REPLACEMENT DUE TO POSSIBLE LOSS OF STRUCTURAL INTEGRITY DURING FLIGHT.						
CORRECTIVE ACTION-THE DUCT WAS REPLACED.						
PROPULSION-WAZ-A/B SUSTAINER	SD/CZ2M64-029-DA1019-7/A-7HO-02-71 OR DUCT, TRANSDUCER BOSS	COMPOSITE-FRD/DPL 7-23203-021	7101 840907	2-4	YES NO	YES 4040248
FAILURE MODE-STRUCTURAL. INSPECTION OF LO2 Y DUCT REVEALED A CRACK IN THE LO2 BREAK AWAY VALVE TEMPERATURE TRANSDUC ER (P10217) BOSS ADJACENT TO THE BOSS AT DUCT WELD.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-POSSIBLE LOSS OF VEHICLE STRUCTURAL INTEGRITY-NEW CORRECTIVE ACTION-REPLACED Y DUCT.						
CORRECTIVE ACTION-REPLACED Y DUCT.						

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CONVAIR DIVISION

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP TIME DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-WA2-A/B SUSTAINER	60A/84P64-010/L3-401-00-894 THRUST CHAMBER	FLIGHT	2860 040811	2-3/PALC YES -2.03 NO			992663
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. TRANSITION FROM IGNITION STAGE TO MAINSTAGE ON SUSTAINER ENGINE WAS A DELAYED 250 MICROSECONDS. THE CAUSE WAS NOT DETERMINED.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE							
PROPULSION-WA2-A/B SUSTAINER	A-88-24-3080F TUBE, FITTING	FAR	75F 021106	SYCAMORE YES GO/C -82 NO 27-17009-11			993693
FAILURE MODE-STRUCTURAL. THE TUBE ASSEMBLY FAILED WHEN ONE NS-20819 SLEEVE WAS FOUND CRACKED. THE FAILURE IS ATTRIB- UTED TO THE INSTABILITY OF THE SOFT CADMIUM-PLATED BRASS SLEEVE TO WITHSTAND THE TORQUE REQUIRED FOR A STEEL TUBING AN D B-NUT INSTALLATION.							
CORRECTIVE ACTION-ALL BRASS SLEEVES IN STOCK AT SYCAMORE WERE SCRAPPED.							
PROPULSION-WA2-A/B SUSTAINER	A-88-24-3081F TUBE	FAR 27-17009-11	75F 020822	SYCAMORE YES GO/C -82 NO			993694
FAILURE MODE-LEAK-EXTERNAL. THE TUBE ASSEMBLY FAILED WHEN THE FLARED ENDS LEAKED. THE FAILURE IS ATTRIBUTED TO INAD- EQUATE DEBURRING PRIOR TO FLARING.							
CORRECTIVE ACTION-FACTORY PERSONNEL WERE REINSTRUCTED IN TUBE FLARING OPERATIONS. WPS 24.106 WAS REVISED.							
PROPULSION-WA2-A/B SUSTAINER	A682-0313/83-401-00-127 PUMP-TURBO	FLIGHT	127D 020311	B-3/MTR YES ROCKETDYNE D NO			992733
FAILURE MODE-OUT OF SPECIFICATION. SUSTAINER THRUST CHAMBER PRESSURE INDICATED AN ALMOST LINEAR DECREASE OF 50 PSI BETWEEN LIFTOFF AND 220 SECONDS. IN CONTRAST, 64 DISCHARGE PRESSURE INCREASED TO PSI DURING THE SAME INTERVAL. DUE T O THE LIMITED INSTRUMENTATION (FOUR PARAMETERS) THE CAUSE OF THE ANOMALIES COULD NOT BE DETERMINED.							
SYSTEM EFFECT-OPERATION TOO LOW. THE ANOMALY RESULTED IN DECREASED SUSTAINER PERFORMANCE.							
VEHICLE EFFECT-LATE SUSTAINER ENGINE CUTOFF. DUE TO DECREASED PERFORMANCE LEVEL, SUSTAINER ENGINE CUTOFF TIME WAS A PROXIMATELY 7.8 SECONDS LATER THAN PLANNED.							
CORRECTIVE ACTION-NONE.							

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MA2-A/B SUSTAINER	AE62-0553 HEAD SUPPRESSION VALVE.	COMPOSITE-FRD/DPL	1270 620509	92/WT9	YES NO		095103
	FAILURE MODE-LEAK EXTERNAL. POST TEST INSPECTION REVEALED A LEAK AT THE HEAD SUPPRESSION VALVE.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-HEAD SUPPRESSION VALVE REPLACED.						
PROPULSION-MA2-A/B SUSTAINER	AE61-1279/L2-405-00-112 SUSTAINER LOX REGULATOR	FLIGHT	1120 620307	2-1/PALC -3.	YES NO		097335
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. WHEN THE HEAD SUPPRESSION GOES ON CONTROL, A PRESSURE SPIKE IS REFLECTED ON THE SUSTAINER LOX REGULATOR DATA WHICH IS APPROXIMATELY 70 PSI ABOVE THE SETTING. DURING THIS TEST THE PRESSURE SPIKE WAS 110 PSI AND LASTED FOR 1.85 SECONDS.						
	SYSTEM EFFECT-OPERATION TOO HIGH. THE SUSTAINER LOX REGULATOR PRESSURE SPIKE WAS REFLECTED IN AN INCREASED GAS GENERATOR PERFORMANCE AND SUBSEQUENT THRUST CHAMBER PRESSURE INCREASE. THIS THRUST OVER SHOOT LASTED THE SAME DURATION AS THE SPIKE (1.85 SECONDS).						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MA2-A/B SUSTAINER	AQ162-0049/B2-401-00-04 ENGINE	FLIGHT	40 620210	92/WT9 164.7	NO NO		090904
	FAILURE MODE-OUT OF SPECIFICATION. AT 164.7 SECONDS THE SUSTAINER ENGINE CHAMBER PRESSURE EXCEEDED 1000 PSI. THIS CONDITION WAS CAUSED BY PRESSURIZATION OF THE VERNIER BOLO TANKS AND CLOSING THE BLEED VALVES WHICH INCREASED THE FLOW OF PROPELLANTS TO THE GAS GENERATOR. THIS ADDITIONAL FLOW SHOULD HAVE BEEN SUPPLIED TO THE VERNIER ENGINES, HOWEVER THE VERNIER PROPELLANT VALVES WERE CLOSED DUE TO A MALFUNCTION IN THE VERNIER SYSTEM.						
	SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. AT 161.4 THE CHAMBER PRESSURE DROPPED TO 0 PSI INDICATING STRUCTURAL FAILURE IN THE SUSTAINER ENGINE SYSTEM.						
	VEHICLE EFFECT-PREMATURE SUSTAINER ENGINE SHUTDOWN. THE RE-ENTRY VEHICLE IMPACTED 3800 NAUTICAL MILES SHORT OF THE TARGET AREA.						
	CORRECTIVE ACTION-NONE.						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SIZE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-NAZ-A/B SUSTAINER	AE91-1106/P2-403-00-33 GAS GENERATOR	COUNTDOWN	930 051113	BE/MTN	YES NO	YES ROCKETDYNE	090711
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. SUSTAINER GAS GENERATOR FAILED TO IGNITE DURING ENGINE START SEQUE NCE.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START. ENGINE START SEQUENCE NOT COMPLETED.</p> <p>VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED.</p> <p>CORRECTIVE ACTION-PROCEDURE REVISED TO CORRECT METHOD OF PURGING G.G.</p>							
PROPULSION-NAZ-A/B SUSTAINER	DA539/L2-402-00-97 TUBING FITTING	COUNTDOWN	970 010702	FALC1-2	YES NO		090291
<p>FAILURE MODE-LEAK EXTERNAL AT FITTING ON SUSTAINER LOX PUMP INLET PRESSURE SENSE LINE.</p> <p>SYSTEM EFFECT-IMPROPER ANALOG SIGNALS.</p> <p>VEHICLE EFFECT-FLIGHT COUNTDOWN ABORTED. LOW TEMPERATURE ENVIRONMENT IN THE THRUST SECTION.</p> <p>CORRECTIVE ACTION-TUBE REPLACED.</p>							
PROPULSION-NAZ-A/B SUSTAINER	AE91-0046/L1-401-00-70 GAS CHARGE LINE NAA ACCUMULATOR	FLIGHT	700 010131	PALC 130	YES NO	YES ROCKETDYNE	0907351
<p>FAILURE MODE-LEAK EXTERNAL-THE GAS CHARGE LINE TO THE NAA ACCUMULATOR APPARENTLY OPENED CAUSING A LOSS OF ACCUMULATOR GAS PRESSURE. LINE FAILURE WAS MOST PROBABLY CAUSED BY A HIGH TEMPERATURE ENVIRONMENT.</p> <p>SYSTEM EFFECT-DEPLETION OF GAS SUPPLY-LOSS OF ACCUMULATOR GAS PRESSURE RESULTED IN A SLIGHT DECAY IN HYDRAULIC PRESSURE WHICH WAS IMMEDIATELY COMPENSATED FOR BY THE HYDRAULIC PUMP. THIS WAS NOTED AS A PRESSURE SURGE OF APPROXIMATELY 350 PSI ABOVE THE 3000 PSIG STEADY STATE LEVEL FOR 1-2 SECONDS. THIS CONDITION WAS LABORATORY SIMULATED.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-ALL SPACE BOOSTER ACCUMULATOR CHARGE LINES TO BE INSULATION WRAPPED PER CIC 13141 AND CIC 12971.</p>							
PROPULSION-NAZ-A/B SUSTAINER	AE90-0831/P2-402-00-95 130 REGULATOR, SEAL	FLIGHT	930 003113	12/ETN 133	YES NO		
<p>FAILURE MODE-OUT OF SPECIFICATION. APPROXIMATELY 9 SECONDS AFTER ENGINE TANKS REPRESSURIZATION FUNCTION, 130 REGULATOR DISCHARGE PRESSURE STARTED INCREASING FROM 890 PSIG AND STABILIZED AT 700 PSIG. SPEC RANGE IS 375 TO 925 PSIG. CAUSE ATTRIBUTED TO MODIFIED REGULATOR PISTON O-RING CAUSING ERRATIC PISTON MOVEMENT.</p> <p>SYSTEM EFFECT-OPERATION TOO HIGH. PRESSURE AT 130 MANIFOLD ABOVE SPEC THROUGHOUT SUSTAINER PHASE. AT SECO PRESSURE</p>							

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME	DISP OTH	PRI OTH	VENDOR NAME VENDOR PART NO	
RECOVERED TO PROPER LEVEL.								007030
VEHICLE EFFECT-NONE. NO DETRIMENTAL EFFECTS RESULTED FROM HIGH 183 PRESSURE.								
CORRECTIVE ACTION-UNKNOWN.								
PROPULSION-MA2-A/B SUSTAINER	A60-0541/P1-402-01-71 PUMP-TURBO	FLIGHT	710 601013	11/ETR 115.4	YES NO	ROCKETDYNE		007304
FAILURE MODE-OUT OF EXPECTED TEST VALUE. SUSTAINER LOX PUMP INLET PRESSURE BEGAN TO DECAY AT 115.4 SECONDS AND APPROXIMATED PUMP CAVITATION PRESSURE BY 140.2 SECONDS. THIS CONDITION WAS ACCOMPANIED BY LOX PUMP SPEED FLUCTUATIONS. PROBABLE CAUSED BY A PARTIAL OBSTRUCTION IN THE LOX LINE UPSTREAM OF THE STAGING VALVE.								
SYSTEM EFFECT-ERRATIC OPERATION-MOMENTARY DOWNWARD TRANSIENTS RESULTED IN THE SUSTAINER CHAMBER PRESSURE. LOX INJECTION MANIFOLD PRESSURE, FUEL PUMP DISCHARGE PRESSURE, GAS GENERATOR CHAMBER PRESSURE, AND BOTH VERNIER ENGINE CHAMBER PRESSURES.								
VEHICLE EFFECT-NONE.								
CORRECTIVE ACTION-NONE.								
PROPULSION-MA2-A/B SUSTAINER	A60-0539/P2-402-00-32 183 REGULATOR, O-RING	FLIGHT	720 600809	12/ETR 166	YES NO			005119
FAILURE MODE-OUT OF TOLERANCE. AT ENGINE TAKEOFF PRESSURIZATION THE 183 REGULATOR DISCHARGE PRESSURE INCREASED FROM 590 PSIG TO LEVELS ABOVE TOLERANCE (575 TO 625 PSIG). CAUSE ATTRIBUTED TO MODIFIED O-RING CAUSING ERRATIC PISTON MOVEMENT.								
SYSTEM EFFECT-OPERATION TOO HIGH. PRESSURE AT 183 MANIFOLD HIGH THROUGHOUT SUSTAINER PHASE. AT RECO PRESSURE RECOVERED TO PROPER LEVEL.								
VEHICLE EFFECT-NONE. NO DETRIMENTAL EFFECTS RESULTED FROM HIGH 183 PRESSURE.								
CORRECTIVE ACTION-UNKNOWN.								
PROPULSION-MA2-A/B SUSTAINER	A60-0561/P2-401-00-32 THRUST CHAMBER	COUNTDOWN 100106	320 600802	12/ETR --.3	YES NO	ROCKETDYNE		003001
FAILURE MODE-OUT OF SPECIFICATION. SUSTAINER ENGINE HAD ROUGH COMBUSTION. RCC ACCELEROMETER LEVEL REACHED 856 AT 1.55 SECONDS AFTER SUSTAINER FLIGHT LOCKIN. SEVERAL PINKHOLE LEAKS FOUND ABOVE THROAT OF COMBUSTION CHAMBER.								
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. AUTOMATIC ENGINE CUTOFF OCCURRED 1.55 SECONDS AFTER SUSTAINER FLIGHT LOCKIN WHEN OVER 20 MILLISECONDS OF BINARY COUNT OF OVER 90 6 WERE ACCUMULATED ON THE SUSTAINER RCC SYSTEM.								
VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. LAUNCH ATTEMPT ABORTED.								
CORRECTIVE ACTION-18 600806 WRITTEN. ENGINE REMOVED AND REPLACED BY SUSTAINER FROM 850.								

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MAS-A/B SUSTAINER	AA80-0035/PI-4CO-02-54 SUSTAINER MAIN FUEL VALVE	COMPOSITE-J FACT	54D 800808	11/ETR	NO NO		092849
<p>FAILURE MODE-ERRATIC OPERATION. DURING FACT TEST THE SUSTAINER MAIN FUEL VALVE WENT INTO CONTROL AT THE PROPER TIME BUT RETURNED TO FULL OPEN 13 SECONDS LATER. FAILURE WAS SECONDARY. CAUSE WAS CYCLING ARM/SAFE SWITCH TO SAFE POSITION.</p> <p>SYSTEM EFFECT-ERRATIC OPERATION. SUSTAINER MAIN FUEL VALVE WENT OUT OF CONTROL.</p> <p>VEHICLE EFFECT-COMPOSITE DELAYED.</p> <p>CORRECTIVE ACTION-NONE. UNDER CIRCUMSTANCES, VALVE OPERATION WAS NORMAL.</p>							
PROPULSION-MAS-A/B SUSTAINER	AA80-0035/PI-4CO-02-54 SUSTAINER FUEL MANIFOLD PRESSURE SWITCH	COMPOSITE-J FACT	54D 800808	11/ETR	NO NO		092849
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. DURING FACT TEST, ENGINE START SEQUENCE WAS TERMINATED BY A MAINSTAGE LIMITER CUTOFF. SUSTAINER FUEL MANIFOLD PRESSURE SWITCH DID NOT PICK UP WHEN MAIN FUEL VALVE OPENED. THIS FAILURE WAS SECONDARY DUE TO A CONTINUOUS PURGE PRESSURE FROM THE RCC CONSOLE. CONSOLE WAS UNDERGOING MODIFICATIONS AND IN ADVERTANTLY ISSUED A PURGE.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START. SUSTAINER FUEL MANIFOLD PRESSURE SWITCH DID NOT ACTIVATE DUE TO INCOMPLETE MODIFICATIONS IN THE RCC PURGE CONSOLE.</p> <p>VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. FACT TEST SIMULATED PROPULSION SYSTEM OPERATION.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>							
PROPULSION-MAS-A/B SUSTAINER	AA80-0035/PI-4CO-01-54 SUSTAINER MAIN LOX AND FUEL VALVES	COMPOSITE-J FACT	54D 800827	11/ETR	YES NO	ROCKETTIME	092850
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. DURING FACT TEST, THE MAIN LOX AND FUEL VALVES ON THE SUSTAINER ENGINE FAILED TO GO INTO CONTROL.</p> <p>SYSTEM EFFECT-OPERATION DOES NOT START.</p> <p>VEHICLE EFFECT-COMPOSITE ABORTED AND RESCHEDULED.</p> <p>CORRECTIVE ACTION-UNKNOWN (NO FURTHER DETAILS KNOWN).</p>							
PROPULSION-MAS-A/B SUSTAINER	AA80-0019/PI-4CO-01-48 PROPELLANT VALVE FUEL SENSE LINE	COMPOSITE-J FACT	48D 800822	11/ETR 10	YES NO		
<p>FAILURE MODE-OUT OF TOLERANCE. LINE FROM PURGE PANEL TO SUSTAINER HYDRAULIC PACKAGE WAS 0.5 INCH INSTEAD OF 0.25 INCH CALLED FOR. THIS LINE SUPPLIES FUEL MOUNTING PRESSURE TO CONTROL PU VALVE.</p>							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
	SYSTEM EFFECT-OPERATION STARTS TOO LATE. PROPELLANT VALVE DID NOT GO INTO CONTROL AT NORMAL 10 SECONDS AFTER ENGINE START BECAUSE OF EXTRA VOLUME IN THIS FUEL LINE. VALVE DID NOT GO INTO CONTROL UNTIL 50 SECONDS AFTER SIMULATED ENGINE START.						094016
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-PROPER SIZE LINE INSTALLED.						
PROPULSION-MAR-A/B SUSTAINER	PTA6577/P1-403-00-42 REGULATOR	COUNTDOWN	42D 600302	11/ETR	YES NO	YES ROCKETDYNE	091634
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. 108 PNEUMATIC REGULATOR OPERATION WAS UNSATISFACTORY DURING ATTEMPTED LAUNCH ON COUNTDOWN. NO ADDITIONAL DATA.						
	SYSTEM EFFECT-ERRATIC OPERATION.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-REGULATOR REPLACED.						
PROPULSION-MAR-A/B SUSTAINER	PTA6560/P1-401-00-42 SUSTAINER/VALVE/LIP SEAL	PRF	42D 600204	11/ETR	YES NO	YES ROCKETDYNE	091771
	FAILURE MODE-LEAK-EXTERNAL. POST-TEST INVESTIGATION REVEALED A SLIGHT FUEL LEAK AT THE SUSTAINER LIP SEAL ON THE SUSTAINER MAIN FUEL VALVE.						
	SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. POST-TEST INVESTIGATION REVEALED A SLIGHT LEAK AT THE SUSTAINER LIP SEAL ON THE SUSTAINER MAIN FUEL VALVE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-REPLACE LIP SEAL.						
PROPULSION-MAR-A/B SUSTAINER	PTA6986/P3-403-01-49 IGNITION DETECTOR CONNECTOR PIN	COMPOSITE-B FACT	49D 600203	13/ETR	YES NO		093270
	FAILURE MODE-OPEN (ELECT). OPEN CIRCUIT INDICATION WAS RECEIVED ON THE SUSTAINER IGNITION DETECTOR LINK CIRCUITRY. THIS WAS CAUSED BY A PLUG CONNECTOR PIN WHICH HAD BEEN PUSHED BACK INTO ITS SOCKET AND WAS NOT MAKING CONTACT.						
	SYSTEM EFFECT-IMPROPER DISCRETE SIGNAL. AN IMPROPER SIGNAL WAS BEING RECEIVED REGARDING THE STATUS OF THE SUSTAINER IGNITION DETECTOR LINK CIRCUITRY.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-A TEMPORARY REPAIR WAS MADE IN ORDER TO COMPLETE THE TEST. THE PLUG WAS REPLACED FOLLOWING THE TEST.						

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## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPUSSION-WAR-A/B SUSTAINER	FTAG88/P1-4CO-03-42 MICROSWITCH GAS GENERATOR BLADE VA LVE CLOSED	COMPOSITE-B FACT	420 900122	11/ETR -9000	YES NO		001672
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. IMMEDIATELY BEFORE COUNTDOWN START MICROSWITCH DID NOT PICK UP AFT ER VALVES WERE CYCLED.							
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS. MICROSWITCH DID NOT GIVE PROPER VALVE POSITION INDICATION.							
VEHICLE EFFECT-COMPOSITE DELAYED. 83 MIN DELAY IN STARTING MAY BE PARTLY DUE TO THIS PROBLEM.							
CORRECTIVE ACTION-MICROSWITCH SET BY HAND. REPLACED AFTER FACT.							
PROPUSSION-WAR-A/B SUSTAINER	AZC-27-113/P3-401-00-40 138 REGULATOR	FLIGHT	400 901210	13/ETR 01	YES NO	YES ROCKETDYNE	007622
FAILURE MODE-OUT OF SPECIFICATION. BETWEEN 81.5 AND 1 PSI/G. EXCEEDING SPEC RANGE 575-625, THEN DECREASED.							
SYSTEM EFFECT-OPERATION TOO HIGH. PRESSURE AT 153 MANIPULATED SPEC HIGH FOR APPROXIMATELY 20 SECONDS.							
VEHICLE EFFECT-NONE. HIGH PRESSURE DID NOT AFFECT 138 OPERATION.							
CORRECTIVE ACTION-UNKNOWN.							
PROPUSSION-WAR-A/B SUSTAINER	52-410-C7-24 SUSTAINER THRUST CHAMBER	CAPTIVE	240 991019	8-2/ETC NO	YES NO	YES ROCKETDYNE NO RL-109-WA-3	004037
FAILURE MODE-STRUCTURAL. ONE TUBE IN THE SUSTAINER ENGINE WAS FOUND RUPTURED ON POST TEST INSPECTION.							
SYSTEM EFFECT-NONE-SUSTAINER ENGINE OPERATION WAS SATISFACTORY ALTHOUGH THRUST CHAMBER PERFORMANCE WAS LOWER THAN O N THE PREVIOUS FIRING.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN-LAST TEST ON MISSILE 240.							
PROPUSSION-WAR-A/B SUSTAINER	AZC-27-033/P4-401-00-13 REGULATOR	COUNTDOWN	130 991019	14/ETR -450	YES NO	YES ROCKETDYNE	
FAILURE MODE-DRIFT. INTEGRATED START SYSTEM REGULATOR DRIFTING.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COUNTDOWN ABORTED AND RE-SCHEDULED. HOLD CALLED IN ATTEMPT TO CORRECT REGULATOR DRIFTING. AFTER HOLD ING 33 MINUTES AND FAILING TO CORRECT PROBLEM, COUNTDOWN ABORTED.							

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-UNKNOWN.							992873
PROPULSION-MAZ-A/B SUSTAINER	32-407-C6-24 ENGINE RELAY BOX, LOCK-IN RELAY	CAPTIVE 900820	240 991005	9-2/8YC 1.76	YES NO	YES ROCKETDYNE	990453
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE SUSTAINER FLIGHT LOCK-IN RELAY (MT4C) FAILED TO ACTIVATE THE SUSTAINER MAINSTAGE CONTROL SOLENOID.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. SUSTAINER AND BOOSTER ENGINE CUTOFF OCCURRED AT 1.76 SECONDS AS A RESULT OF THE RELAY NOT ACTIVATING.							
VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. NO DETRIMENTAL EFFECT ON VEHICLE.							
CORRECTIVE ACTION-REPLACED ENGINE RELAY BOX.							
PROPULSION-MAZ-A/B SUSTAINER	32-404-B4-24 SUSTAINER THRUST CHAMBER	CAPTIVE	240 990918	96/8YC	NO NO	NO ROCKETDYNE	990972
FAILURE MODE-STRUCTURAL. LACK OF EXTERNAL COOLANT WATER FLOW RESULTED IN OVERHEATING OF CHAMBER. A TOTAL OF 7 TUBE CRACKS WITHIN THE CHAMBER WERE FOUND.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REPAIRED.							
PROPULSION-MAZ-A/B SUSTAINER	A2C-27-077/P4-403-00-10	FLIGHT	100 990908	14/ETR 293.3	NO NO		990771
FAILURE MODE-FAIL TO CEASE OPERATION AT PRESCRIBED TIME. ABNORMAL SUSTAINER SHUTDOWN OCCASIONED BY THE LACK OF A CUTOFF SIGNAL. CUTOFF SIGNAL COULD NOT OCCUR BECAUSE OF LOW VEHICLE ACCELERATION DUE TO THE FAILURE TO JETTISON THE BOOSTER SECTION.							
SYSTEM EFFECT-OPERATION TOO LONG. SUSTAINER SHUTDOWN WAS THE RESULT OF PROPELLANT DEPLETION. ALTHOUGH A MANUAL FUEL CUTOFF SIGNAL WAS RECEIVED AFTER SUSTAINER SHUTDOWN, ALL PROPELLANT VALVES REMAINED OPEN BECAUSE HYDRAULIC CLOSING PRESSURE HAD DECAYED TO ZERO. AS A RESULT, RESIDUAL THRUST ACTED UPON THE MISSILE. THIS THRUST IS THOUGHT TO BE THE RESULT OF GAS AND/OR LIQUID LEAKAGE THROUGH THE OPEN PROPELLANT VALVES OF THE ENGINES AND OPEN BLADE VALVE OF THE SUSTAINER GAS GENERATOR.							
VEHICLE EFFECT-IMPROPER TRAJECTORY. THE RESIDUAL THRUST ACTING UPON THE MISSILE IS THOUGHT TO BE THE CAUSE OF INTERMITTENT CONTACT BETWEEN THE MISSILE AND PAYLOAD FOR APPROXIMATELY 83 SECONDS AFTER RETROCKET FIRING.							
CORRECTIVE ACTION-NONE							



GENERAL INFORMATION  
CONTAINING DETAILS

10 JAN 1981

REPORTED BY: [REDACTED] [REDACTED] [REDACTED]

DATE	REPORTED BY	REPORTED BY NAME	REPORTED BY ADDRESS	REPORTED BY PHONE	REPORTED BY FAX	REPORTED BY TELETYPE	REPORTED BY OTHER
10 JAN 1981	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

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GENERAL INSTRUCTIONS  
CONTAINED HEREIN

10-10-55

REPAIRS TO BE MADE TO THE FOLLOWING

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RECEIVED BY THE NATIONAL ARCHIVES  
ON 10/10/1963

# THE UNIVERSITY OF CHICAGO

# 1

THE FOLLOWING IS A SUMMARY OF THE INFORMATION RECEIVED FROM THE ABOVE SOURCES:

[illegible]

REPORT	TO BOOKING
100	100
100	100

THE COURT WILL NOT BEYOND A DOUBT BE INTERESTED IN THE FACTS OF THE CASE.

**THE UNIVERSITY OF MICHIGAN LIBRARY**

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THE UNIVERSITY OF CHICAGO PRESS

**【参考文献】**

GENERAL INSTRUCTIONS  
COMPLAIN DIVISION

INSTRUCTIONS FOR THE COMPLAIN DIVISION

DATE	TIME	NAME	ADDRESS	PHONE	DATE	TIME	NAME	ADDRESS	PHONE
1958-08-08	10:00	JOHN J. BROWN	12345 MAIN ST.	123-4567	1958-08-08	10:00	JOHN J. BROWN	12345 MAIN ST.	123-4567

000131

THE FOLLOWING INFORMATION WAS OBTAINED FROM THE RECORDS OF THE COMPLAIN DIVISION ON 8-8-58:

JOHN J. BROWN, 12345 MAIN ST., 123-4567, ADVISED THAT HE HAD BEEN ADVISED BY A PERSON WHOSE NAME HE COULD NOT REMEMBER THAT HE SHOULD CONTACT THE COMPLAIN DIVISION REGARDING A MATTER OF HIS OWN.

END OF PAGE

THE FOLLOWING INFORMATION WAS OBTAINED FROM THE RECORDS OF THE COMPLAIN DIVISION ON 8-8-58:

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END OF PAGE

000161

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PAGE 0072

GENERAL INFORMATION  
COMPLAINT DETAILS

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CONFIRMED BY THE REGULATOR BY THE ALBANY

DATE	REGULATOR'S NAME	DATE OF SOURCE	DATE OF	DATE OF	DATE OF
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**FOR THE RECORD: THE 1990-1991 BUDGET**

**PAGE DATA**

**COMMERCIAL DIVISION**

**SUPPLY CULTURE METHOD-PROPAGATION SYSTEM-41-800000**

[illegible]

RECORDS MANAGEMENT  
DIVISION

1977 CALIFORNIA REVISED PROPOSITION 57 (EN-1) RESPONSE

SPECIES AND SUBSPECIES	TEST REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	DATE TIME DIF	PRI OTM	VENDOR NAME VENDOR PART NO
SPACER EFFECT-OPERATOR TOO LONG. FUEL START TANK FAILED TO PRESSURIZE IN EXPECTED TIME.  SOURCE EFFECT-COMBAT RESPONSE AND COMBUSTION ABORTED.  CORRECTIVE ACTION-TAN REGULATOR REPLACED.						
REGULATOR-PRE-LUN PUMP	DA7142-WD-30-12 TAN REGULATOR	COMPOSITE-PRO/DOL 1SD	980613	A-S/MTR	YES	ROCKETDYNE NO
FUELING MORE-ERRATIC OPERATION-DURING THE COMBAT SEQUENCE THE REGULATOR PRESSURE BECAME ERRATIC, FLUCTUATING BETWEEN 2 PSI AND ONE PSI.						
BOOSTER EFFECT-MORE. LOSS OF MEDIAN BOOSTLE PRESSURE.  EFFECTS EFFECT-MORE						
CORRECTIVE ACTION-AIRBORNE PREHEATERS CHECK VALVES AND THE REGULATOR WERE REPLACED.						
ENGINE EFFECT-PRE-LUN PUMP	574-3-00-35 WAKE-OVER	FLIGHT	730 980619	ADDRESS-1	YES	NAA NO
INJECT MORE-ONE ISOLATING CHECK VALVE IN THE ENGINE LOW TANK PRESSURIZING LINE FAILED TO CLOSE AT ENGINE TANK REPR PRESSURIZATION.  BOOSTER EFFECT-MORE.  SOURCE EFFECT-MORE.						
CORRECTIVE ACTION THIS IS A REDUTIVE PROBLEM. ECP HAS-148 WAS GENERATED FOR SLV VEHICLES WHICH CHANGED VALVE POPP ET MATH-AL PUMP DAMPER TO REFLOW. REGENERATION TO COVER AND VEHICLES WITH THIS ECP HAS BEEN DISAPPROVED. A PRE-PL MENT READY' FROM JLA OVER PER FOR BUS-19 IS PRESENTLY PERFORMED ON ALL VEHICLES.						
REGULATOR-EFFECT-4-3 PUMP	581-00-73 PUMPS-PLST	COUNTDOWN	730 980619	ADDRESS-1	YES	NAA NO R3600CCX12-010 0
PUMPE MORE-EXTREMELY LOW. THE FUEL LINE BETWEEN THE BCG AND THE BOOSTER LOW REGULATOR FAILED.  BOOSTER EFFECT-GENERAL COMPARTMENT TEMPERATURES DROPPED RAPIDLY.  SOURCE EFFECT-THE PLANTS WERE ABANDONED.  CORRECTIVE ACTION-THE FUEL LINE WAS REPLACED.						

PAGE 0078



GENERAL DYNAMICS  
CONVAIR DIVISION

18 APR 1946

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-HAZ-A/B GENERAL	62A-AP201-001/01-402-00-106 REGULATOR	FLIGHT	1460 650112	9748-1/11 TR 272	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-OUT OF EXPECTED VALUE. IRREGULAR OSCILLATIONS OF THE 100 REGULATOR OUTPUT PRESSURE.</p> <p>SYSTEM EFFECT-NONE. OSCILLATIONS OF 35 PSI P-P WERE NOTED IN THE 100 REGULATOR OUTPUT PRESSURE MEASUREMENT DURING THE VEHICLE ZERO PHASE. SAME AS NOTED ON VEHICLES 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, AND 3000.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE.</p>						
PROPULSION-HAZ-A/B GENERAL	62A03-0000/03-403-00-142 RELAY	FLIGHT	1420 630428	8-3/4TR D-	YES NO	YES NO
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. TRANSITION FROM IGNITION STAGE TO MAIN STAGE ON THE SUSTAINER ENGINE WAS APPROXIMATELY 0.6 SECONDS LATE. LATE ENERGIZING OF RELAY RTSC WAS DETERMINED TO BE THE MOST PROBABLE CAUSE. NO LVL DATA RECORDED IT AND RECORDS INVALID.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-HAZ-A/B GENERAL	22043-021/04043/12-4170-01-139 RELAY RTSC	COMPOSITE-PRD/DPL	1390 630402	1-2/PALC NO	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-OPERATIC OPERATION-POSSIBLE STICKY REGULATOR PISTON.</p> <p>SYSTEM EFFECT-OPERATIC OPERATION CAUSED PRESSURE FLUCTUATIONS IN START SYSTEM.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-REGULATOR REPLACED.</p>						
PROPULSION-HAZ-A/B GENERAL	A403-0006/7A922/12-4ND-02-119 REGULATOR	COMPOSITE-PRD/DPL	1190 630423	1-2/PALC NO	YES NO	YES NO
<p>FAILURE MODE-OPERATIC OPERATION IN INITIATED START SYSTEM REGULATOR.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						

GENERAL DYNAMICS  
CONVAIR DIVISION

13 JUN 1969

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-HW-2/8 GENERAL	AD61-0042/01-401-00-48 RANGE LINE	FLIGHT	480 830818	8-1/MTW -600	NO NO	886417
<p>FAILURE MODE-EXTERNAL LEAK. THE BOOSTER HYDRAULIC SYSTEM PRESSURE STARTED AN UNUSUAL DECAY AT 1-600 SECONDS FROM A NORMAL VALUE OF 800 PSIG TO 250 PSIG. THE PRESSURE RECOVERED TO 310 PSIG BY 1 PLUS 77 SECONDS. THIS READING IS CRP GROUP AS THE SYSTEM PRESSURE SWITCHES DID NOT ACTIVATE. ATTRIBUTED TO A FROZEN PRESSURE TRANSDUCER SENSE LINE CAUSE BY AN LINE LEAK OR CLOSE PROXIMITY OF THE SENSE LINE TO THE LINE SHROUD.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-HW-2/8 GENERAL	AD61-0042/02-401-01-114 INTEGRATED START SYSTEM REGULATOR	COMPOSITE-PRO/DPL	1140 811216	1-2/PALC	YES NO	897379
<p>FAILURE MODE-ERRATIC OPERATION. ERRATIC OUTPUT OF 188 REGULATOR UPON PRESSURIZATION OF START TANKS.</p> <p>SYSTEM EFFECT-ERRATIC OPERATION. PRESSURE SURGES IN 188 SYSTEM.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-HW-2/8 GENERAL	AE61-0242/02-401-00-93 188 PNEUMATIC REGULATOR	FLIGHT	930 810324	82/MTW 78	YES NO	897989
<p>FAILURE MODE-DRIFT. FROM 78 SECONDS THRU VECO THE 188 REGULATOR DISCHARGE PRESSURE DRIFTED OFF NOMINAL OF 600 PLUS OR MINUS 25 PSIG TO A HIGH OF 640 PSIG AND A LOW OF 560 PSIG. AT VECO THE PRESSURE WAS 560 PSIG. ATTRIBUTED TO IMPROPER REGULATOR OPERATION.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE.</p>						
PROPULSION-HW-2/8 GENERAL	AE61-0747/04-402-00-79 INTEGRATED START SYSTEM REGULATOR, O-RING	FLIGHT	790 800919	14/ETR 187	YES NO	897989
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. AT VERNIER ENGINE TANKS PRESSURIZATION, THE 188 REGULATOR DISCHARGE PRESSURE BEGAN TO INCREASE FROM 600 PSIG REACHING LOCK-UP PRESSURE OF 900 PSIG AT 219 SECONDS. RANGE IS 575 TO 625 PSIG. THIS BECAUSE IS ATTRIBUTED TO AN O-RING MODIFICATION TO THE REGULATOR PISTON WHICH CAUSE INCREASED PISTON MOVEMENT.</p> <p>SYSTEM EFFECT-OPERATION TOO HIGH-PRESSURE AT THE 188 MANIFOLD WAS HIGH BETWEEN 810 SECONDS AND ALSO WHEN PRESSURE A</p>						

13 JUN 1968

GENERAL DYNAMICS  
CONVAIR DIVISION

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	DATE TIME DIF	PRI OTH	VENDOR NAME VENDOR PART NO
RETURNED TO THE PROPER LEVEL.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-HAZ-A/B GENERAL	AERO-0338/P1-402-00-80	FLIGHT	900 900702	11/ETR 19-26	NO NO	ROCKETDOME
FAILURE MODE: OUT OF EXPECTED TEST VALUE. THRUST LEVEL OF BOOSTER DETERIORATED AT INTERVALS WHEN BGC CYCLED FROM PUMP TO TANK FEED ON FLIGHT. SIDE AS RESULT OF INTERMITTENT SHORT IN RELAY BOX OR HARNESS. SUBSTAINER AND VERNIER PERFORMANCE DETERIORATED STARTING AT 188 SECONDS FROM LACK OF CONTROL PRESSURE TO SUBSTAINER FOR REGULATOR RESULTING FROM SAME ELECTRICAL SHORT.						
SYSTEM EFFECT-OPERATION TOO LOW. DECREASE IN THRUST OF ALL ENGINES.						
VEHICLE EFFECT-IMPROPER TRAJECTORY. LOWER THAN NOMINAL THRUST PERFORMANCE RESULTED IN LOW CUT OFF VELOCITY AND FAILURE TO ATTAIN TARGET RANGE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-HAZ-A/B GENERAL	AERO-0338/P1-402-00-82 ENGINE LOW TANK PRESSURIZATION, CH ECK VALVE, SEAL	FLIGHT	920 900822	14/ETR 193.	YES NO	ROCKETDOME
FAILURE MODE-INTERNAL LEAK. LOW ISOLATION CHECK VALVE LEAKED LOW INTO J88 MANIFOLD WHEN ENGINE LOW TANK PRESSURE BECAME HIGHER THAN PNEUMATIC REGULATOR OUTLET PRESSURE. WHICH OCCURS NORMALLY FOLLOWING BOOSTER JETTISON.						
SYSTEM EFFECT-CONTAMINATION. SOX LEAKED INTO J88 MANIFOLD AND ENGINE FUEL TANK. VERNIER FUEL SUPPLY PRESSURE IS 646 AFTER THAN LOW SUPPLY THEORETICALLY PREVENTING LOW FLOW INTO THE FUEL SYSTEM.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-RUBBER DYNAMIC POPPET O-RING ON LOW ISOLATION CHECK VALVE REPLACED WITH TEFLON DYNAMIC POPPET O-RING.						
PROPULSION-HAZ-A/B GENERAL	AERO-0338/P1-403-00-34 ENGINE RELAY BOX PRE-RELEASE CUTOFF P DISARM RELAY	FLIGHT	920 900833	11/ETR -1.33	YES NO	
FAILURE MODE-ERRATIC OPERATION. THE PRE-RELEASE CUTOFF DISARM RELAY DROPPED OUT MOMENTARILY WITHIN ITS OPERATING CYCLE. THE CAUSE IS UNKNOWN. THE FIRST DROPOUT OCCURRED AT -1.94, REACTIVATED AT -1.4 SECONDS, DROPPED OUT AGAIN AT -1.31 SEC. AND REACTIVATED FINALLY AT -0.76 SECONDS.						
SYSTEM EFFECT-OPERATION STARTS TOO LATE. MISSILE HOLDDOWN TIME WAS EXTENDED FROM 4.88 SECONDS TO 8.48 SECONDS.						
VEHICLE EFFECT-PRIMAIRE PROPULSION CUTOFF. EXTENDED HOLDDOWN TIME RESULTED IN INCREASED PROPELLANT WEIGHT. RESULTS IN INCREASED ACCELERATION, WHICH LED TO PREMATURE CUTOFF TIMES. BOOSTER CUTOFF WAS 8.8 SECONDS EARLY, SUBSTAINER 1 8.7, AND VERNIER 10.4 SECONDS. NO ABNORMAL EFFECT WAS NOTED ON THE MISSION.						

GENERAL DYNAMICS  
CONVAIR DIVISION

18 JUN 1986

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP TIME	SITE DIP TIME	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-WA2-A/B GENERAL	LM2D-448942-2/P4-401-00-48 FUEL START TANK PRESSURIZING VALVE	COUNTDOWN	480 800524	14/ETR	YES NO	097428 894020
FAILURE MODE-LEAK-EXTERNAL. DURING 2-1 DAY FUEL TANKING, A FUEL LEAK WAS FOUND AT THE FUEL START TANK PRESSURIZING VALVE IN THE 133 PACKAGE. SYSTEM EFFECT-NONE. VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. CORRECTIVE ACTION-FUEL WAS DETAINED AND A NEW PRESSURIZATION VALVE WAS INSTALLED.						
PROPULSION-WA2-A/B GENERAL	AE80-0322P2-403-00-36 CHECK VALVE IN THE 133 MANIFOLD	FLIGHT	540 800520	12/ETR 165.9	YES NO	097728
FAILURE MODE-LEAK INTERNAL. A LEAKY LOX ISOLATION CHECK VALVE IN THE INTEGRATED START SYSTEM MANIFOLD. SYSTEM EFFECT-CONTAMINATION OF 133 MANIFOLD WITH GOR. CORRECTIVE ACTION-NONE. UNKNOWN.						
PROPULSION-WA2-A/B GENERAL	AE80-0322/P2-403-00-36 ENGINE LOX TANK PRESSURIZATION ONE OR VALVE	FLIGHT	540 800520	12/ETR 165.9	YES NO	097501
FAILURE MODE-LEAK INTERNAL. CHECK VALVE LEAKED GOR INTO 133 MANIFOLD WHEN ENGINE WAS 1400 PSI PRESSURE BECAME HIGH ER THAN PREVIOUSLY. LOX TANK OUTLET. PRESSURE WHICH OCCURRED NORMALLY FOLLOWING BOOSTER JETTISON. SYSTEM EFFECT-CONTAMINATION. GOR LEAKED INTO 133 MANIFOLD. VERNIER FUEL SUPPLY PRESSURE IS GREATER THAN LOX SUPPLY THEREBY PREVENTING LOX FLOW INTO THE 133 SYSTEM. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-MATERIAL OF LOX TANK ISOLATION CHECK VALVE POPPET O-RING CHANGED FROM RUBBER TO TEFLON.						
PROPULSION-WA2-A/B GENERAL	PTAB240/P4-400-02-29 ENGINE RELAY BOX	COMPOSITE-J FACT	280 800818	14/ETR	NO NO	
FAILURE MODE-OUT OF SPECIFICATION. A CONTINUOUS SUSTAINER AND VERNIER CUTOFF SIGNAL WAS RECEIVED AFTER A GUIDANCE VERNIER CUTOFF SIGNAL WAS INITIATED, WHICH PREVENTED DETERMINATION OF PROGRAMMER BACKUP VERNIER CUTOFF AND RANGE SAFE TV MANUAL FUEL CUTOFF. SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS. SUSTAINER AND VERNIER ENGINE CUTOFF SIGNALS WERE HELD IN BY FEEDBACK FROM						

15 JUN 1966

GENERAL DYNAMICS  
CONVAIR DIVISION

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OIN	VENDOR NAME VENDOR PART NO
THE UPPER STAGE FOLLOWING THE VERNIER CUTOFF DISCRETE. VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-PROBLEM WAS CAUSED BY A FEEDBACK OF 20 VOLTS FROM THE SECOND STAGE MIDAS SATELLITE. A DIODE WAS PLACED IN THE CIRCUIT BETWEEN THE PROGRAMMER AND THE ENGINE RELAY BOX.						
PROPULSION-WAZ-A/B GENERAL	31612/91-408-85-36 SWITCH	CAPTIVE	360 391E07	31/8YC	NO	NO
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE BOOSTER COOLANT LIGHT ON THE FIREH CONSOLE FAILED TO INDICATE BOOSTER-COOLANT FLOW AT BOOSTER CUTOFF. POST TEST INSPECTION REVEALED FAULTY OPERATION OF THE PRESSURE SWITCH THAT ACTIVATES THE BOOSTER COOLANT CONSOLE LIGHT.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.						
VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. THE SUSTAINER AND VERNIER ENGINES WERE CUTOFF BY THE TEST CONDUCTOR.						
CORRECTIVE ACTION-REPLACED BOOSTER COOLANT PRESSURE SWITCH.						
PROPULSION-WAZ-A/B GENERAL	FTAB340/P4-4CO-01-20 ENGINE RELAY BOX, WIRING	COMPOSITE-B FACT	200 5910E9	14/ETR	YES NO	YES NO
FAILURE MODE-FAIL TO OPERATE. A MISNUMBERED WIRE AT THE ENGINE RELAY BOX WAS WIRED INCORRECTLY AND PRECLUDED RECEIPT OF A GUIDANCE SUSTAINER CUTOFF DISCRETE.						
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS. A GUIDANCE SUSTAINER CUTOFF DISCRETE WAS NOT RECEIVED AT THE ENGINE RELAY BOX DUE TO INCORRECT WIRING CAUSED BY A MISNUMBERED WIRE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-CORRECTION OF WIRING ERROR.						
PROPULSION-WAZ-A/B GENERAL	A2C-87-063/P3-48H-03-26	COMPOSITE-PRD/DPL	240 H910E6	13/ETR	YES NO	YES NO
FAILURE MODE-LEAK-EXTERNAL. SEVEN LEAKS WERE FOUND IN THE FUEL SYSTEM. LOCATION OF THE LEAKS IS UNKNOWN.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE PROBLEM WAS CORRECTED.						

GENERAL DYNAMICS  
CONVAIR DIVISION

13 JUN 1966

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PPI VEHICLE PART NO
PROPULSION-WAS-A/B GENERAL	D492/A1-401-00-19 RELAY, TIMER	PRF	190 980908	A-1/MTR 8-23	NO NO
<p>FAILURE MODE-PREATURE OPERATION-ALL ENGINES SHUTDOWN AT 8.23 SECONDS DUE TO EARLY ACTIVATION OF FAILURE RELEASE CUTOFF TIMER, WHICH WERE SET FOR 10 SECONDS.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. PROPULSION SYSTEM WAS SHUTDOWN APPROXIMATELY 2 SECONDS EARLIER THAN PLANNED.</p> <p>VEHICLE EFFECT-NONE. PREMATURE BOOSTER AND SUSTAINER ENGINE CUTOFF WAS EXPECTED DUE TO EMATIC FAILURE RELEASE CUTOFF TIMER OPERATION. TEST WAS CONSIDERED SATISFACTORY.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>					
PROPULSION-WAS-A/B GENERAL	D492/A2-400-04-12 GAS GENERATOR IGNITER LINES, UNBILICAL CONNECTOR	COMPOSITE-PRD/DPL	120 980904	A-2/MTR NO	NO
<p>FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. DURING COMBAT SEQUENCE A FAIL INDICATION WAS RECEIVED ON THE 66 16 NITER LINES CONTINUITY CHECK DUE TO A LOOSE JUDOS UNBILICAL.</p> <p>SYSTEM EFFECT-OPERATION STOP PREMATURELY.</p> <p>VEHICLE EFFECT-COMBAT SEQUENCE AND TEST ABORTED.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>					
PROPULSION-WAS-A/B GENERAL	50-441-08-02 REGULATOR	CAPTIVE	20 980904	SE/SYC 12-2	NO NO
<p>FAILURE MODE-PREATURE OPERATION-CHART OBSERVER. MISINTERPRETED F1280P START TANK PNEUMATIC REGULATOR OUTLET. THIS MEASUREMENT WAS NO LONGER REQUIRED.</p> <p>SYSTEM EFFECT-OPERATION STOPS PREMATURELY. OBSERVER CUTOFF.</p> <p>VEHICLE EFFECT-PREATURE PROPULSION CUTOFF.</p> <p>CORRECTIVE ACTION-IMPROVE CHART OBSERVERS.</p>					
PROPULSION-WAS-A/B GENERAL	52C-27-010/P3-002-00-03 GROUND FUEL FILL AND DRAIN VALVE	FLIGHT	20 880414	13/ETR -210	YES NO
<p>FAILURE MODE-LEAN, EXHAUST, SEVERAL GALLONS OF FUEL WAS TRAPPED IN THE LINE BETWEEN THE GROUND AND AIRBORNE FILL AND DRAIN VALVES DUE TO A MECHANICAL ERROR THAT DID NOT PROVIDE FOR CYCLING THE VALVE AFTER FUEL TANKING. THIS FUEL WAS LOST AT DISCONNECT.</p> <p>SYSTEM EFFECT-NONE.</p>					

GENERAL DYNAMICS  
CONVAIR DIVISION

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

18 JUN 1966	SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI VENDOR NAME	OTH VENDOR PART NO	
092610		VEHICLE EFFECT-NONE. THE COMBINATION OF THIS FUEL WITH LIQUID OXYGEN LEAKING FROM THE A/B LIQUID OXYGEN FILL AND DR AIN VALVE CAUSED AN EXPLOSION EXTERNAL TO THE MISSILE AT 0.8 SECOND AFTER 8-INCH MOTION. THERE WAS NO APPARENT DAMAG E TO THE MISSILE AS A RESULT OF THE EXPLOSION.						
092612		CORRECTIVE ACTION-THE SEQUENCING PROCEDURE WAS REVISED TO CORRECT THE DISCREPANCY WHICH PRECLUDED DRAINING OF FUEL FROM THE LINE BETWEEN THE GROUND AND AIRBORNE VALVES AFTER FUEL TANKING.						
	PROPULSION-WA2-A/B GENERAL	AZC-27-030/P3-402-00-03 A/B LIQUID OXYGEN FILL AND DRAIN V ALVE	FLIGHT 30	990414	13/CTR -810	YES NO		
	FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. OPEN CONDITION OF LIQUID OXYGEN FILL AND DRAIN VALVE POSSIBLY CAUS ED BY VALVE BUTTERFLY SHAFT FAILURE SOMETIME AFTER PFW AND BEFORE LAUNCH.							
	SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. LEAKAGE THROUGH THIS VALVE STARTING AT THE TIME OF DISCONNECT CAUSED IMME DIATE 36 PERCENT REDUCTION IN BE ENGINE PERFORMANCE.							
	VEHICLE EFFECT-PREATURE BOOSTER ENGINE SHUTDOWN. ENGINE COMPARTMENT EXPLOSION AND BOOSTER SHUTDOWN AT 26 SECONDS A NO MISSILE DESTRUCT IN RESPONSE TO RANGE SAFETY COMMAND AT 36 SECONDS.							
097411	CORRECTIVE ACTION-BUTTERFLY ACTUATOR SHAFT WILL BE FABRICATED OF STEEL INSTEAD OF ALUMINUM STARTING WITH MISSILE 25 0.							
	PROPULSION-WA2-A/B GENERAL	ZM-7-854/PC-350-08-03 ENGINE RELAY BOX-RESISTOR	COMPOSITE-FACTORY 5C	590180		FACTORY YES	ROCKETDYNE NO	
	FAILURE MODE-FAIL TO OPERATE AT PRESURIZED TIME. THE PROPULSION SYSTEM ENGINES COULD NOT BE RESET.							
	SYSTEM EFFECT-OPERATION DOES NOT START.							
	VEHICLE EFFECT-COMPOSITE DELAYED.							
097410	CORRECTIVE ACTION-EXP 9371-182 WHEN APPROVED WOULD ALLEVIATE THIS PROBLEM. THE REMEDY WOULD CONSIST OF ADDING A 15 OHM RESISTOR IN LIEU OF A 10 OHM RESISTOR WHICH WOULD DROP CUTOFF RELAY VOLTAGE BELOW 2.0 VDC AND GUARANTEE RESET.							
	PROPULSION-WA2-A/B GENERAL	ZM-7-857/PC-350-08A-07 ENGINE RELAY BOX	COMPOSITE-FACTORY 7C	591808		FACTORY YES	ROCKETDYNE NO	
	FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. BOOSTER RESET WAS NOT INDICATED.							
	SYSTEM EFFECT-OPERATION DOES NOT START. ENGINE RESET DID NOT OCCUR.							
	VEHICLE EFFECT-COUNTDOWN ON COMPOSITE DELAYED OR RESCHEDULED.							
	CORRECTIVE ACTION-UNUSUAL.							

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SIZE TIME DIF	PRE OTH	VENDOR NAME VENDOR PART NO
PROPUSSION-MA3-A/B BOOSTER	/A1-4RD-01-899 B-MUT	COUNTDOWN	2990 030320	A1/MTR	YES NO	000000
FAILURE MODE-LEAK EXTERNAL. FUEL FOUND LEAKING AT B-MUT ON IGNITOR FUEL VALVE. (B1).						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-COUNTDOWN DELAYED.						
CORRECTIVE ACTION-B-MUT TIGHTENED.						
PROPUSSION-MA3-A/B BOOSTER	CD/A-AP284-087/01-802-00-03 B1 MAIN FUEL VALVE	FLIGHT	3F 040403	08172/MT R	YES NO	001204
FAILURE MODE-FAILED TO OPERATE AT PRESCRIBED TIME. B1 MAIN FUEL VALVE OPENED 0.95 SECONDS LATE. TESTS DETERMINED THE MOST PROBABLE CAUSE TO BE THE VALVE STICKING.						
SYSTEM EFFECT-OPERATION STARTS TOO LATE. THE MAIN FUEL VALVE OPENED TOO LATE FOR B1 ENGINE TO START. THE B2 ENGINE STARTED PROPERLY.						
VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY UNBALANCED THRUST CAUSED THE VEHICLE TO TOPPLE FROM THE LAUNCHER AND SELF DESTRUCT.						
CORRECTIVE ACTION-ALL MAIN FUEL VALVES WERE RECALLED AND REMOVED BECAUSE TESTING DISCOVERED OTHER VALVES IN LONG 3 DEVICE TO BE STICKING. ROCKETDINE REPORT NUMBER R-2971-BEP CONTAINS THE RESULTS OF INVESTIGATIONS INTO THE CAUSES OF THE VALVE FAILURE.						
PROPUSSION-MA3-A/B BOOSTER	00A83-0070 B1 FUEL VALVE LINE	FLIGHT	43F 031003	F-2/MTR D	YES NO	000000
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. B1 MAIN FUEL VALVE FAILED TO OPEN BECAUSE THE VALVE ACTUATION LINE WAS CLOGGED. THE MATERIAL WAS DETERMINED TO BE HYPERCOL FROM PREVIOUS TESTS OF THE ENGINE.						
SYSTEM EFFECT-OPERATION DOES NOT START. B1 ENGINE DID NOT ACHIEVE MAINSTAGE OPERATION.						
VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. THE VEHICLE EXPLODED AT LIFTOFF.						
CORRECTIVE ACTION-NEW PURGING PROCEDURES WERE INITIATED, AND UPON COMPLETION OF ACCEPTANCE TESTING THE MAIN FUEL VALVE ACTUATION LINE OF EACH ENGINE WAS TO BE REPLACED WITH A NEW LINE.						
PROPUSSION-MA3-A/B BOOSTER	A1A83-0009/P1-60N-01-133 VOLUME BLEED BOSS ELBOW SEALS	COMPOSITE-PRO/DPL	193F 030411	11/ETR	YES NO	000000
FAILURE MODE-LEAK EXTERNAL. A SEEPING FUEL LEAK WAS DISCOVERED AT THE B2 FUEL PUMP VOLUME BLEED BOSS ELBOW SEALS IN 27 (A030430) AFTER THE FIRST FUEL TANKING TEST.						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PHI OTH	VENDOR NAME VENDOR PART NO	
SYSTEM EFFECT-NONE.							098223
VEHICLE EFFECT-NONE							
CORRECTIVE ACTION-THE AM333-4C SEALS WERE REPLACED.							
PROPULSION-WAS-A/B BOOSTER	AC-43-0004/82-807-310-79 BI GAS GENERATOR FOR POPPET	CAPTIVE	737 830808	82/8YC 0	YES NO		098216
FAILURE MODE-INTERNAL LEAK. THE BI 90 LOR INJECTION PRESSURE INDICATED LEAKAGE PRIOR THE POPPET DURING SPIN CHARGE PERATION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE.							
PROPULSION-WAS-A/B BOOSTER	A0J82-0010/01-502-00-84 LUBE OIL TANK FITTING	FLIGHT	84E 821218	08TF-1/M TR 0	NO NO	ROCKETDYNE	098109
FAILURE MODE-STRUCTURAL. THE B2 LUBE OIL TANK FILL AND DRAIN DISCONNECT FITTING WAS SUSPECTED TO BE DAMAGED AT LIFT OFF AS A RESULT OF THE PRESSURE PULSE CAUSING THE B2 ENGINE BOOT TO HIT THE FITTING.							
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY IN THE B2 LUBE OIL TANK OCCURRED. THIS RESULTED IN FAILURE OF THE A PIMION GEAR IN THE TURBOPUMP AND FAILURE OF THE ENGINE.							
VEHICLE EFFECT-LOSS OF VEHICLE STABILITY FOLLOWED BY LOSS OF INTEGRITY AS A RESULT OF B2 ENGINE SHUTDOWN.							
CORRECTIVE ACTION-METHOD OF ATTACHING BOOTS TO THE ENGINE WAS IMPROVED PRESSURE PULSE MAGNITUDE WAS REDUCED BY CHANGING ENGINE START CHARACTERISTICS.							
PROPULSION-WAS-A/B BOOSTER	A0J82-0047/01-804-00-08 FUEL VOLUME TEE LINE	COUNTDOWN	84F 820818	11/YER NO	YES NO		098223
FAILURE MODE-LEAK-EXTERNAL. FUEL VOLUME TEE TO FUEL IGNITER VALVE LINE FOUND LEAKING PRIOR TO START OF COUNTDOWN.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COUNTDOWN DELAYED. START OF COUNTDOWN DELAYED TO REPLACE FUEL VOLUME TEE. RP PACKAGES NO. 1 AND NO. 2 ALSO REPLACED DURING DELAY BECAUSE OF BLOW COMBUSTORS.							
CORRECTIVE ACTION-REPLACED LEAKING TEE.							

GENERAL DYNAMICS  
CONVAIR DIVISION

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PR1 DIP	VENDOR NAME VENDOR PART NO
PROPULSION-NA3-A/B BOOSTER	AC-62-0033/62-608-A3-73 B1 GAS GENERATOR FOR POPPET	CAPTIVE	73F 620603	62/8YC Q	YES NO	YES NO
FAILURE MODE-INTERNAL LEAK. TEST DATA INDICATED A MINOR HOT GAS LEAK PAST THE B1 66 LOR POPPET PRIOR TO IGNITION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE GAS GENERATOR WAS REMOVED AND LEAK CHECKED, FOUND ACCEPTABLE, AND REINSTALLED.						
PROPULSION-NA3-A/B BOOSTER	AC-62-0034/62-601-A2-73 B1 LOR VALVE.	CAPTIVE	73F 620703	62/8YC Q	YES NO	YES NO
FAILURE MODE-OUT OF TOLERANCE. MODIFICATION TO LOR VALVE (NA3-230) INCLUDED AN ENLARGED SPRING CAVITY WHICH RESULTED IN ENTRAPPED GAS THEREBY SLOWING THE RESPONSE OF THE VALVE. SLOW B1 LOR VALVE OPENING RESULTED IN A MARGINAL BOOSTER START SEQUENCE.						
SYSTEM EFFECT-OPERATION TOO LONG. SLOW B1 LOR VALVE OPENING RESULTED IN A MARGINAL BOOSTER START SEQUENCE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-MODIFICATION WAS REMOVED AND THE ORIGINAL HARDWARE RE-INSTALLED.						
PROPULSION-NA3-A/B BOOSTER	A62-0074/P1-62N-04-07 B2 FUEL PREVALVE	COMPOSITE-PRO/DPL 27-21200-3	77 620213	11/ETR -1.27	YES NO	YES NO
FAILURE MODE-LEAK EXTERNAL. AFTER TANKING TEST, FUEL WAS FOUND IN PLASTIC BELLONS COVER ON B2 FUEL PREVALVE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-VALVE WAS IR/D AND REPLACED.						
PROPULSION-NA3-A/B BOOSTER	A62-1231/P3-503-00-36 GAS GENERATOR, ORIFICE	FLIGHT	506 01219	13/ETR -1.27	YES YES	YES YES
FAILURE MODE-OUT OF SPECIFICATION. GAS GENERATOR RETROFIT (WHICH REQUIRED RE-ORIFICING). RESULTED IN INSTALLATION OF 1 INCORRECT ORIFICE SIZE.						
SYSTEM EFFECT-OPERATION TOO LONG. LOW BOOSTER ENGINE PERFORMANCE (B3), RESULTING FROM INCORRECT PROPELLANT FLOWS.						
VEHICLE EFFECT-LATE BOOSTER CUTOFF. BOOSTER CUTOFF WAS 3.3 SECONDS LATER THAN PLANNED (AS A RESULT OF LOW BOOSTER (B3) ENGINE PERFORMANCE). OUTSANCE MADE NECESSARY CORRECTIONS DURING SUSTAINER PHASE FOR PROPER IMPACT.						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFF. - 100 REVIEW-PROPELLION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-NONE, NO CORRECTIVE ACTION REQUIRED.						
PROPELLION-MA3-A/B BOOSTER	AC61-1231/P3-803-00-36 GAS GENERATOR	FLIGHT	30E 011210	13/ETR -1.37	YES YES	ROCKETDYNE
FAILURE MODE-OUT OF TOLERANCE. UNDETECTED RESTRICTION IN GAS GENERATOR PROPELLANT FEED SYSTEM. SYSTEM EFFECT-OPERATION TOO LOW. LOW BOOSTER ENGINE PERFORMANCE (B1), RESULTING FROM INCORRECT PROPELLANT FLOW. VEHICLE EFFECT-LATE BOOSTER CUTOFF. BOOSTER CUTOFF WAS 3.3 SECONDS LATER THAN PLANNED AS A RESULT OF LOW BOOSTER B 1) ENGINE PERFORMANCE. GUIDANCE MADE NECESSARY CORRECTIONS DURING SUSTAINER PHASE FOR PROPER IMPACT. CORRECTIVE ACTION-NONE. NO CORRECTIVE ACTION REQUIRED.						
PROPELLION-MA3-A/B BOOSTER	AA61-0212/P3-802-00-34	COUNTDOWN	34E 011210	13 -40	YES NO	
FAILURE MODE-OUT OF SPECIFICATION. BOOSTER LOW PUMP INLET TEMPERATURE EXCEEDED REDLINE SPECIFICATION DURING LOW SLU C TRANSFER. TEMPERATURE WAS -275 DEG. F, WHERE REDLINE TEMP IS -280 DEG F MAX. SYSTEM EFFECT-NONE. VEHICLE EFFECT-COUNTDOWN DELAYED. HOLD CALLED AS RESULT OF HIGH LOW PUMP INLET TEMP. POWER CHANGEOVER SWITCH PROBLE M DURING THIS HOLD RESULTED IN COUNTDOWN ABORT. CORRECTIVE ACTION-NONE.						
PROPELLION-MA3-A/B BOOSTER	AC61-0103/B1-609-10-01 B1 SOLID PROPELLANT GAS GENERATOR	CAPTIVE	1F 011115	31/STC 5.0	YES NO	ROCKETDYNE
FAILURE MODE-FAIL DURING OPERATION. THE B1 SOLID PROPELLANT GAS GENERATOR EXPLODED AT IGNITION. SOME FRAGMENTS WERE EXPULSED THROUGH THE B1 NOZZLE CAUSING MINOR MISSILE DAMAGE. SYSTEM EFFECT-OPERATION DOES NOT START. B1 GAS GENERATOR TEMPERATURE, AS MONITORED BY REDLINE MEASUREMENT P17137, D ID NOT INCREASE TO THE EXPECTED LEVEL. DATA INDICATED THAT THE B1 ENGINE FAILED TO FIRE. VEHICLE EFFECT-ORIENTATION PROPELLION CUTOFF. ENGINE OPERATION WAS TERMINATED PREMATURELY AT 5.0 SECONDS BY THE CHART OBSERVER MONITORING MEASUREMENT P17137. CORRECTIVE ACTION-INSPECTION OF THE SOLID PROPELLANT GAS GENERATOR CASE REVEALED THAT THE CASE WALL THICKNESS WAS B ELOW SPECIFICATIONS. BETTER QUALITY CONTROL MEASURES WERE INITIATED BY ROCKETDYNE AS A RESULT OF THIS FAILURE.						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MA3-A/B BOOSTER	AC-82-0008/31-803-10-01 B1 SOLID PROPELLANT GAS GENERATOR	CAPTIVE	IF 611113	9-1/3YC 5.0	YES NO	YES NO ROCKETDYNE 950982-21
FAILURE MODE-STRUCTURAL. THE REAR CASING OF THE SOLID PROPELLANT GAS GENERATOR BLEW OUT AT IGNITION. POSSIBLY CAUSE D BY OUT OF TOLERANCE WALL THICKNESS.						
SYSTEM EFFECT-EXPLOSION.						
VEHICLE EFFECT-TEMPERATURE PROPULSION CUTOFF. OBSERVED CUTOFF WHEN B1 GAS GENERATOR COMBUSTOR TEMPERATURE MEASUREMENT EXCEEDED REDLINE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MA3-A/B BOOSTER	AC-81-0094/31-803-10-01 MAIN FUEL VALVES	CAPTIVE	IF 610925	9-1/3YC 21.0	YES NO	YES NO ROCKETDYNE
FAILURE MODE-OUT OF EXPECTED VALUE. AN ABNORMALLY RAPID OPENING OF THE MAIN FUEL VALVES OCCURRED AT ENGINE START. I T IS BELIEVED THAT MOISTURE GOT INTO THE TUBE ASSEMBLY FROM THE HYPERCOL CONTAINER TO THE FUEL VALVE AND THE VALVE A CTUATOR. WHEN HYPERCOL CONTACTS THE MOISTURE, THE RESULTANT CHEMICAL REACTION CREATED AN OVERPRESSURIZATION, WHICH O PENED THE MAIN FUEL VALVE TOO FAST.						
SYSTEM EFFECT-OPERATION TOO LOW. THE FUEL PUMP DISCHARGE PRESSURE DROPPED BECAUSE OF THE RAPID OPENING.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MA3-A/B BOOSTER	AD41-0203/04397/01-840-04-04 HEATER, 8P46	COMPOSITE-FRD/DPL	24E 610925	F/VTR	YES NO	YES NO
FAILURE MODE-FAIL DURING OPERATION. ENGINE BROWN POWER RED INDICATION DUE TO FAILURE OF BOOSTER NO 1 SOLID PROPELL ANT G & HEATER.						
SYSTEM EFFECT-OPERATION DOES NOT START.						
VEHICLE EFFECT-COASTDOWN DELAYED.						
CORRECTIVE ACTION-HEATER REPLACED.						
PROPULSION-MA3-A/B BOOSTER	AD407/01-140-04-03 HEATER, 8P46	COMPOSITE-FRD/DPL	24E 610925	F/VTR	YES NO	YES NO
FAILURE MODE-FAIL DURING OPERATION. AT 1 MINUTE AFTER COMPOSITE START THE BOOSTER 1 SOLID PROPELLANT GAS GENERATOR FAILED AND AN ENGINE BROWN POWER RED INDICATION WAS RECEIVED ON THE LSC. FAILURE TRACED TO HEATER MALFUNCTION.						
VEHICLE EFFECT-ENGINE DOES NOT START.						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PSI OTM	VENDOR NAME VENDOR PART NO	
	VEHICLE EFFECT-COMPOSITE DELAYED OR RESCHEDULED. CONNECTIVE ACTION-THE HEATER WAS REPLACED.						000349
PROPULSION-M43-A/B BOOSTER	AC-01-0090/01-004-A4-01 TANK, LUBE OIL	CAPTIVE	1P 010922	01/01/66 0.02	YES NO		000027
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE 01 HIGH PRESSURE LUBE OIL PRESSURE INDICATED AN ABNORMAL SPIKE TO 240 PSIG PRIOR TO THE NORMAL RISE TIME. NORMAL RISE WAS NOTED FOLLOWING THE SPIKE. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M43-A/B BOOSTER	AC-01-0090/01-004-A4-01 THRUST CHAMBER	CAPTIVE	1P 010922	01/01/66 0.02	YES NO		000340
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. 01 THRUST WAS CALCULATED FROM CHAMBER PRESSURE DATA TO BE 0.3 PERCENT BELOW NOMINAL THRUST OF 165,000 POUNDS. SYSTEM EFFECT-OPERATION TOO LOW. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M43-A/B BOOSTER	AD01-0292/04396/01-340-00-24 HEATER, GAS GENERATOR	COMPOSITE-FACTORY	24E 010921	F/01/66 0.02	YES NO		007027
	FAILURE MODE-FAIL DURING OPERATION. ENGINE GROUND POWER FAIL INDICATION DUE TO FAILURE OF BOOSTER NO 1 SOLID PROPELLANT G & HEATER. SYSTEM EFFECT-OPERATION DOES NOT START. VEHICLE EFFECT-COMPOSITE DELAYED. CORRECTIVE ACTION-HEATER WAS REPLACED.						
PROPULSION-M43-A/B BOOSTER	AC-01-0090/01-004-A4-01 ROCKETTUBE	CAPTIVE	0E 010910	01/01/66 0.02	YES NO		
	FAILURE MODE-ERRATIC OPERATION-COMBUSTION INSTABILITY DUE TO PRESENCE OF ENTRAPPED GASES IN THE TURBOPUMP FUEL HOLD UP DURING ENGINE START TRANSITION.						PAGE 0099

GENERAL DYNAMICS  
CONVAIR DIVISION

# DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PHI OTM	VENDOR NAME VENDOR PART NO
SYSTEM EFFECT-OPERATION STOPS PREMATURELY- BOOSTER ENGINE ROUGH START AND SUBSEQUENT ROUGH COMBUSTION CUTOFF BY RCC.						
VEHICLE EFFECT-PREMATURE BOOSTER ENGINE CUTOFF.						
CORRECTIVE ACTION-IT WAS RECOMMENDED BY ROCKETRYNE THAT PUMP VOLUME BLEEDS BE INSTALLED PRIOR TO ALL HOT FIRINGS.						
PROPULSION-M3-A/B BOOSTER	AB-61-0014/14-610-J4 B1 GAS GENERATOR	CAPTIVE	1-4F 610601	1-4	YES NO	
FAILURE MODE-STRUCTURAL. POST-TEST INSPECTION REVEALED WARPING IN THE VICINITY OF ONE OF THE BOSSES. REMOVAL OF THE GENERATOR REVEALED THAT A SECTION OF THE BAFFLE WAS MISSING.						
SYSTEM EFFECT-NONE. EVIDENCE OF A HOT SPOT WAS FOUND IN ONE AREA OF THE CASE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-REPLACED B1 GAS GENERATOR.						
PROPULSION-M3-A/B BOOSTER	DA344/L2-4NO-05-97 LOX FLEX NOSE	COMPOSITE-FRD/DPL	97C 610706		PALC/1-E YES NO	
FAILURE MODE-LEAK EXTERNAL IN THE BOOSTER LOX REGULATOR NOSE.						
SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT.						
VEHICLE EFFECT-COUNTDOWN ABORTED.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M3-A/B BOOSTER	AB-61-0011/14-609-E1 BOOSTER ENGINE NO. 1	CAPTIVE	1-4F 610615	EDWARDS 1.03	YES NO	
FAILURE MODE-FAIL DURING OPERATION EXCESSIVE ACCELERATION LEVELS ON BOOSTER NO. 1 NOTED AT 1.03 SECONDS AFTER LIGHT ON.						
SYSTEM EFFECT-OPERATION STOP PREMATURELY. ENGINE CUTOFF SEQUENCE INITIATED BY BOOSTER NO. 1 PRIMARY RCC COMMAND AT 1.13 SEC.						
VEHICLE EFFECT-PREMATURE BOOSTER ENGINE SHUT DOWN.						
CORRECTIVE ACTION-ENGINE REMOVED EVEN THOUGH THE ROCKETRYNE REPRESENTATIVE STATED THAT THE ENGINE WAS SATISFACTORY FOR HOT FIRINGS.						

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GENERAL DYNAMICS  
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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PRI OFM	VENDOR NAME VENDOR PART NO	
PROPULSION-MAS-A/B BOOSTER	AE91-0348/01-302-00-27 B1 THRUST CHAMBER	FLIGHT	B7E 910807	0817-1/4 TR 0.6	YES NO	ROCKETDYNE	007600
FAILURE MODE-ERRATIC OPERATION. B1 ENGINE SHUTDOWN AT 0.8 SECONDS. POST TEST HARDWARE INVESTIGATION INDICATED COMBUSTION INSTABILITY.							
SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. B1 ENGINE WAS BADLY DAMAGED.							
VEHICLE EFFECT-PRIMATURE BOOSTER SHUTDOWN. SUBSEQUENT TO SHUTDOWN THE VEHICLE BELF DESTROYED.							
CORRECTIVE ACTION-INSTALL BAPPLIED BOOSTER THRUST CHAMBER INJECTORS AND USE INERT FUEL LEAD.							
PROPULSION-MAS-A/B BOOSTER	AC-B1-0073/31-801-A1-01 B2 THRUST CHAMBER	CAPTIVE	IF 910417	81/8YC RDS	YES NO	ROCKETDYNE LBB9-MAT	004285
FAILURE MODE-OUT OF TOLERANCE. DURING NORMAL BOOSTER ENGINE SHUTDOWN, THE B2 ENGINE SHOWED NOVAH SHUTDOWN CHARACTERISTICS. AN AFTERFIRE OF APPROXIMATELY ONE SECOND DURATION RESULTED IN EXCESSIVE RCC COUNT AND WAS BELIEVED RESPONSIBLE FOR HIGH PRESSURE SURGES AT THE B2 LOX PUMP INLET.							
SYSTEM EFFECT-ERRATIC OPERATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-MAS-A/B BOOSTER	AB-B1-0006/14-802-C3 B66 LOX POPPET VALVE	PAR	1-4F 910418	1-4/EDMA RDS	YES NO	ROCKETDYNE	001642
FAILURE MODE-INTERNAL LEAK. MOMENTARY OPENING OF THE B66 LOX POPPET ALLOWING GAS LEAKAGE INTO THE B2 B6 LOX INJECTOR ON MANIFOLD AND LOCKING IT UP UNTIL NORMAL OPENING OF B66 LINK VALVE.							
CORRECTIVE ACTION-NONE.							
PROPULSION-MAS-A/B BOOSTER	AE90-0955/P3-503-00-08 B1 BOOSTER GAS GENERATOR	FLIGHT	BE 910124	13/ETR T-0	YES NO	ROCKETDYNE	
FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE B1 BOOSTER GAS GENERATOR OPERATED APPROXIMATELY 4 PERCENT ABOVE EXPECTED VALUE DUE TO INADEQUATE TRANSPORTATION OF 66 COMBUSTION CHAMBERS PRIOR TO FLIGHT.							
SYSTEM EFFECT-OPERATION TOO HIGH. B1 ENGINE OPERATED AT APPROXIMATELY 3000 POUNDS THRUST OVER NOMINAL DUE TO GAS BE GENERATOR OPERATIONS ABOVE EXPECTED VALUE.							
VEHICLE EFFECT-NONE. THE THRUST EXCESS WAS PARTIALLY OFFSET BY A SIMILAR DECREASE ON B2 AND THE IMBALANCE WAS WELL WITHIN THE CAPABILITY OF THE VEHICLE SYSTEMS TO MAINTAIN PROPER TRAJECTORY.							

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
	CORRECTIVE ACTION-UNKNOWN.					
PROPULSION-M43-A/B BOOSTER	AERO-0889/P3-903-00-04 BE BOOSTER GAS GENERATOR	FLIGHT	BE 010124	13/27R 7-0	YES NO	YES ROCKETDYNE
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE BE BOOSTER GAS GENERATOR OPERATED APPROXIMATELY 3 PERCENT BELOW EXPECTED VALUE DUE TO INADVERTENT TRANSPORTATION OF 64 COMBUSTION CHAMBERS PRIOR TO FLIGHT.					
	SYSTEM EFFECT-OPERATION TOO LOW. BE ENGINE THRUST WAS APPROXIMATELY 5000 POUNDS BELOW NOMINAL DUE TO GAS GENERATOR OPERATION BELOW EXPECTED VALUE.					
	VEHICLE EFFECT-NONE. THE THRUST DEFICIENCY WAS PARTIALLY OFFSET BY A SIMILAR INCREASE ON B1 AND THE IMBALANCE WAS WELL WITHIN THE CAPABILITY OF THE VEHICLE SYSTEMS TO MAINTAIN THE PROPER TRAJECTORY.					
	CORRECTIVE ACTION-UNKNOWN.					
PROPULSION-M43-A/B BOOSTER	ETR-031/14-531-03-02 BE RCC ACCELEROMETER WIRING	CAPTIVE	001125	1-4/EDMA R03	YES NO	YES ROCKETDYNE
	FAILURE MODE-ERRATIC OPERATION. THE BE WAA RCC DEVICE COAX CABLE WAS GROUNDING TO THE SHIELD DUE TO A COLDSOLDER JOINT.					
	SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS. ERRONEOUS INDICATIONS OF ROUGH COMBUSTION WERE BEING GENERATED BY THE RCC SYSTEM.					
	VEHICLE EFFECT-PREMATURE PROPULSION CUTOFF. THE TEST WAS TERMINATED BY RCC CUTOFF.					
	CORRECTIVE ACTION-THE RCC DEVICE AND COAX CABLE WERE REPLACED.					
PROPULSION-M43-A/B BOOSTER	ETR-031/14-531-03-02 BE THRUST CHAMBER TUBES	CAPTIVE	001125	1-4/EDMA R03	YES NO	YES ROCKETDYNE
	FAILURE MODE-STRUCTURAL. POST-TEST INSPECTION REVEALED TWO SPLIT TUBES INSIDE THE BE CHAMBER 3 INCHES BELOW THE INJECTION. THE SPLITS WERE 3/8 INCH LONG.					
	SYSTEM EFFECT-NONE.					
	VEHICLE EFFECT-NONE.					
	CORRECTIVE ACTION-REPAIR TUBES.					

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-M43-A/B BOOSTER	ETR-030/14-330-03-BE B2 TURBOPUMP ASSEMBLY	CAPTIVE	801116	1-4/EDMA RDS	YES NO	ROCKETDYNE	092277
	FAILURE MODE-STRUCTURAL. POST-TEST INSPECTION REVEALED THAT THE B2 TURBOPUMP ASSEMBLY WAS LOOSE AT THE PUMP MOUNTS.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-ACCELEROMETERS WERE ADDED TO DETERMINE THE VIBRATION ENVIRONMENT.						
PROPULSION-M43-A/B BOOSTER	ETR-030/14-330-03-BE B1 TURBOPUMP ASSEMBLY	CAPTIVE	801116	1-4/EDMA RDS	YES NO	ROCKETDYNE	092262
	FAILURE MODE-STRUCTURAL. POST TEST INSPECTION REVEALED THAT THE B1 TURBOPUMP ASSEMBLY WAS LOOSE AT THE PUMP MOUNTS.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-ACCELEROMETERS WERE ADDED TO DETERMINE THE VIBRATION ENVIRONMENT.						
PROPULSION-M43-A/B BOOSTER	AC-80-0048/82-513-A7-02 B1 LOX TOPPING CHECK VALVE	CAPTIVE	82 801115	82/8YC	YES NO		099983
	FAILURE MODE-STRUCTURAL- THE CHECK VALVE WAS FOUND TO BE BADLY CALLED. THIS WAS DISCOVERED DURING POST TEST INSPECTION.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
PROPULSION-M43-A/B BOOSTER	AC-80-0048/82-513-A7-02 B2 TURBOPUMP GEAR BOX	CAPTIVE	82 801119	82/8YC	YES NO	ROCKETDYNE	092278
	FAILURE MODE-LEAK EXTERNAL. A LUBE OIL LEAK WAS DISCOVERED AT THE B2 GEAR BOX. MOST PROBABLE CAUSE WAS LOOSENING OF THE TURBINE TO GEAR CASE THRU-BOLTS. DISCOVERED DURING POST FIRING INSPECTION.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-UNKNOWN.						

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# DIFFICULTIES REVIEW-PROPOSITION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH	VEHICLE NAME VEHICLE PART NO
PROPULSION-M43-A/B BOOSTER	ETR-089/14-489-C8-SE B1 MAIN FUEL VALVE	CAPTIVE	601100	1-4/EDMA RDS 118.01	YES NO	YES ROCKETDYNE
FAILURE MODE-OUT OF EXPECTED VALUE. THE FUEL VALVE CLOSED ABNORMALLY BLW AT CUTOFF.						
SYSTEM EFFECT-ERRATIC OPERATION. RCC DATA INDICATED ROUGH BURNING AFTER CUTOFF.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-M43-A/B BOOSTER	AC-80-0041/32-312-A8-02 B1 TURBOPUMP	CAPTIVE	2C 601014	62/8YC 76.4	YES NO	YES ROCKETDYNE
FAILURE MODE-OUT OF TOLERANCE. NOZZLE BLOCK BETWEEN FIRST AND SECOND STAGE TURBINE WHEELS LOADED ALLOWING THE VAN ES TO DISPLACE INTO THE SECOND STAGE WHEEL.						
SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. B1 PERFORMANCE DETERIORATED WHEN DAMAGE WAS INCURRED BY THE TURBINE ASSEMBLY. B1 LOW PRESSURE FUEL DUCT AND THE B1 MAIN FUEL AND LOW VALVE CONTROL ASSEMBLY.						
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF. TEST TERMINATED BY OBSERVER CUTOFF.						
CORRECTIVE ACTION-POST TEST INSPECTION REVEALED THAT A SPLIT-RING, WHICH ACTS AS A STIFFENER FOR THE NOZZLE BLOCK 1 INSTALLATION, HAD NOT BEEN INSTALLED. ALL DAMAGED HARDWARE WAS REPLACED.						
PROPULSION-M43-A/B BOOSTER	ETR-081/14-317-CZ-SE B1 THRUST CHAMBER TUBE	CAPTIVE	600809	1-4/EDMA RDS	YES NO	YES CO/C NO ROCKETDYNE
FAILURE MODE-STRUCTURAL. A SPLIT CHAMBER FUEL COOLANT TUBE WAS DISCOVERED DURING POST TEST INSPECTION. THE SPLIT EX TENDED UNDER THE SECOND RETAINING BAND.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE COOLANT TUBE WAS REPAIRED BY THE VENDOR.						
PROPULSION-M43-A/B BOOSTER	A480-0104/10-601-00-03 LUBE OIL PUMP SHAFT	PRY	2C 600808	10/ETR NO	NO NO	YES ROCKETDYNE
FAILURE MODE-STRUCTURAL. SHAFT WAS TERMINATED DUE TO A LACK OF 0-2 LUBE OIL PRESSURE. INVESTIGATION REVEALED THE 02 LUBE OIL PUMP SHAFT CREAMED DUE TO FRICTION FROM 02 LUBE OIL LINE WORMS.						
OTHER EFFECT-REDUCTION OF LUBRIC SUPPLY. LOSS OF LUBE OIL TO THE 02 TURBINE.						
VEHICLE EFFECT-REDUCTION OF LUBRIC SUPPLY. LOSS OF LUBE OIL TO THE 02 TURBINE.						



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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PSI OIM	VENDOR NAME VENDOR PART NO
URE.						093903
	CORRECTIVE ACTION-B2 ENGINE WAS REPLACED.					
PROPULSION-MJ3-A/B BOOSTER	FTAB339/PS-501-00-03 B2 LUBE OIL PUMP, BLAFT	PNP	3E 000925	13/ETR	NO NO	090019
	FAILURE MODE-FAIL DURING OPERATION. DURING PNP, THERE WAS NO LUBE OIL PRESSURE INDICATION. THE B2 LUBE OIL PUMP WAS PT WAS SHEARED DUE TO FREEZING FROM B2 BLU CHILL LINE LEAK. FAILURE WAS APPARENTLY SECONDARY TO THE LEAK.					
	SYSTEM EFFECT-OPERATION DOES NOT START. NO LUBE OIL PRESSURE.					
	VEHICLE EFFECT-REDUCED PROPULSION CUT-OFF. PROPULSION WAS CUT-OFF BY COMMAND WHEN NO LUBE OIL PRESSURE WAS NOTED.					
	CORRECTIVE ACTION-REPLACED B2 ENGINE WITH THE B2 ENGINE FROM 4E.					
PROPULSION-MJ3-A/B BOOSTER	ETR-021/14-519-02-02 GAS GENERATOR, ORIFICE	CAPTIVE	000908	1-4/EDNA RDS	YES NO	090030
	FAILURE MODE-FAIL DURING OPERATION. THE B1 ENGINE THRUST LEVEL WAS 3.75 PERCENT ABOVE THE NOMINAL OF 3.0 PERCENT.					
	SYSTEM EFFECT-OPERATION TOO HIGH.					
	VEHICLE EFFECT-NONE.					
	CORRECTIVE ACTION-THE B1 GAS GENERATOR LOW FUEL SYSTEM WAS REDESIGNED TO RAISE THE PERFORMANCE LEVEL WITHIN TOLERAN CE.					
PROPULSION-MJ3-A/B BOOSTER	AC-60-0033/02-509-A3-02 B2 GAS GENERATOR ORIFICE	CAPTIVE	3E 000908	02/0YC	YES NO	090001
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. B2 ENGINE PERFORMANCE LEVEL WAS 3.1 PERCENT LOW AS A RESULT OF IMPROPER OR IFICING TO THE BOOSTER GAS GENERATOR. B2 CHAMBER PRESSURE WAS 821 PSIG DURING THE RUN.					
	SYSTEM EFFECT-OPERATION TOO LOW.					
	VEHICLE EFFECT-NONE.					
	CORRECTIVE ACTION-GAS GENERATOR WAS REDESIGNED FOR IMPROVED RUN.					
						Page 0004

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-WA3-A/B BOOSTER	AC-80-0033/32-507-A3-02 GAS GENERATOR LOX POPPETS	CAPTIVE	ZE 800423	SE/3YC NO	YES NO	YES ROCKETDYNE	099997
FAILURE MODE-FAILURE DURING OPERATION. POST TEST INSPECTION REVEALED THAT BOTH THE B1 AND B2 G.O. LOX POPPETS HAD B ECOME STRETCHED.							
SYSTEM EFFECT-OPERATION TOO HIGH- HIGH G.O. PERFORMANCE DURING POST FIRING.							
VEHICLE EFFECT-NONE							
CORRECTIVE ACTION-BOTH GAS GENERATORS WERE REPLACED.							
PROPULSION-WA3-A/B BOOSTER	AC-80-0033/32-507-A3-02 B2 BLUE TRANSFER CHECK VALVE	CAPTIVE	ZE 800623	SE/3YC NO	YES NO		099995
FAILURE MODE-STRUCTURAL. VALVE STEM GUIDE BROKE OFF AND FELL INTO THE ENGINE. VALVE STEM GUIDE WAS FOUND IN B2 IN RUST CHAMBER LOX DOME SCREEN. THIS WAS DISCOVERED DURING POST TEST INSPECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-WA3-A/B BOOSTER	AC-80-0030/32-502-A2-02 B1 GAS GENERATOR LOX POPPET	CAPTIVE	ZE 800729	SE/3YC 0.915	YES NO	YES ROCKETDYNE	099286
FAILURE MODE-PREMATURE OPERATION. B1 G.G. POPPET VALVE CRACKED PREMATURELY.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-SURGE SUPPRESSORS WERE INSTALLED IN THE B46 FEED SYSTEM.							
PROPULSION-WA3-A/B BOOSTER	ETR-016/14-316-02-32 GAS GENERATOR, ORIFICES	CAPTIVE	800729	1-4/EDMA R03	YES NO	YES ROCKETDYNE	
FAILURE MODE-OUT OF SPECIFICATION OR TOLERANCE. PERFORMANCE OF BOTH BOOSTER ENGINES WAS BELOW THE ALLOWABLE 3 PERCE NT LEVEL. PRIOR TO THIS TEST THE G.O. WATERMAN REGULATORS WERE REPLACED WITH ORIFICES IN THE LOX SYSTEM PER GMA 5104							
SYSTEM EFFECT-OPERATION TOO LOW.							
VEHICLE EFFECT-NONE.							

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## DIFFICULTIES REVIEW-PROPELLION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-THE ORIFICES WERE REPLACED.							090273
PROPELLION-MA3-A/B BOOSTER	AC-60-0088/48-501-A1-02 846 BOOSTRAP FLEX LINE	CAPTIVE	EC 000719	BE/STC	YES NO	ROCKETDYNE MA-3-28538-E	091460
FAILURE MODE-CONTAMINATION. RUBBER PARTICLES WERE FOUND UPSTREAM OF THE 846 INJECTORS DURING POST TEST INSPECTION.							
SYSTEM EFFECT-OPERATION TOO LOW. BOOSTER ENGINE PERFORMANCE WAS 10 PERCENT LOW.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-BOOSTRAP FLEX LINES WERE REPLACED. ENGINE FUEL AND/OR SYSTEMS WERE CLEANED AND FLUSHED. THIS SAME CONDITION OCCURRED DURING RUN 52-503-A2-02.							
PROPELLION-MA3-A/B BOOSTER	AE62-0351/32-001-A1-33 CHECK VALVE	CAPTIVE	33F 02314	3-2/STC 11-62	YES NO		090610
FAILURE MODE-OUT OF EXPECTED TEST VALUE. INADVERTENT ACTIVATION OF THE THRUST CHAMBER LOZ DOME AND BOOSTER GAS GONE RATOR LOZ PURGE DURING THE FIRING ALLOWED GAS TO ENTER LOZ SYSTEM.							
SYSTEM EFFECT-OPERATION TOO LOW. ACTIVATION OF THE PURGE DURING FIRING RESULTED IN LOWERING OF THE B1 THRUST BY 455 PER CENT BELOW NOMINAL AND BE BY 0.67 PERCENT.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPELLION-MA3-A/B SUSTAINER	A1-4MO-01-211 TUBING 8-MUT	COMPOSITE-PRD/DPL	211D 050203	A-3/STC	YES NO	ROCKETDYNE	090754
FAILURE MODE-LEAK EXTERNAL. FUEL FOUND IN THRUST SECTION DUE TO A LEAK AT THE SUSTAINER BOOST STRAP LINE 8-MUT.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COMPOSITE DELAYED.							
CORRECTIVE ACTION-8-MUT TORQUED PROPERLY.							
PROPELLION-MA3-A/B SUSTAINER	A3-4MO-03-240 TUBING 8-MUT	COMPOSITE-PRD/DPL	240D 040702	A-3/STC	YES NO	ROCKETDYNE	
FAILURE MODE-LEAK EXTERNAL AT THE ACTUATOR LINE FITTING ON THE SUSTAINER (USE OIL TANK PRESSURIZING VALVE).							
SYSTEM EFFECT-NONE.							

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO
VEHICLE EFFECT-COMPOSITE DELAYED.						
CORRECTIVE ACTION-B-NUT TORQUED PROPERLY.						
PROPULSION-WA3-A/B SUSTAINER	60A63-0439/01-501-00-72 GAS GENERATOR	FLIGHT	783 631024	P-1/MTB 0	YES NO	000004
FAILURE MODE-ERRATIC OPERATION. OSCILLATIONS OCCURRED IN THE GAS GENERATOR PERFORMANCE FOLLOWING MAINTENANCE TRANSMIT/ON AND CONTINUED FOR APPROXIMATELY 2 SECONDS FOLLOWING VEHICLE ENGINE IGNITION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-WA3-A/B SUSTAINER	AC-63-0011/52-615-819-75 SUSTAINER THRUST CHAMBER	CAPTIVE	75F 630625	52/SYC 10.14	YES NO	000002
FAILURE MODE-FAIL DURING OPERATION. SUSTAINER ENGINE PERFORMANCE PARAMETERS INDICATED A HIGH FREQUENCY PRESSURE SURGE IN THE CHAMBER DOME AREA AT MECO PLUS 0.27 SECONDS.						
SYSTEM EFFECT-OPERATION TOO LONG. ABNORMAL SUSTAINER SHUTDOWN CHARACTERISTICS.						
VEHICLE EFFECT-NONE. THIS WAS THE LAST TEST ON THIS VEHICLE.						
CORRECTIVE ACTION-ENGINE TEAR DOWN WAS RECOMMENDED BY ROCKETDYNE.						
PROPULSION-WA3-A/B SUSTAINER	60/A63-0363/01-501-00-66 GAS GENERATOR POPPET	FLIGHT	62E 630604	P-1/MTB 0	YES NO	000000
FAILURE MODE-ERRATIC OPERATION. INSTRUMENTATION INDICATED THE SUSTAINER LOX REGULATION TO BE SLIGHTLY UNSTABLE AT R-EGULATOR FULL OPEN. THE CAUSE WAS DETERMINED TO BE THE LOW POPPET VALVE IN THE SUSTAINER GAS GENERATOR.						
SYSTEM EFFECT-ERRATIC OPERATION. SUSTAINER GAS GENERATOR FUEL AND LOX INJECTION MANIFOLD PRESSURES WERE SUBJECT TO RANDOM OSCILLATIONS DURING THE FIRST 4 SECONDS OF FLIGHT. PEAK-TO-PEAK VALUES REACHED 100 PSI. NO ADVERSE SYSTEM EFFECTS WERE OBSERVED.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-LOW POPPET IN 666 INJECTOR WAS CHANGED FROM METERING TYPE TO NON-METERING TYPE.						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-NA3-A/B SUSTAINER	60/AB3-0120/P1-801-00139 GAS GENERATOR	FLIGHT	1337 630426	11	YES NO	YES ROCKETDYNE	890682
<p>FAILURE MODE-STRUCTURAL. THE GAS GENERATOR POPPET EXPERIENCED DEFORMATION DURING OPERATION WHICH RESULTED IN ENLARGEMENT OF THE ANGULAR GAP.</p> <p>SYSTEM EFFECT-ERRATIC OPERATION. THE ENLARGEMENT OF THE POPPET CHANGED GAS GENERATOR PERFORMANCE AND WAS REFLECTED IN RANDOM TURBO PUMP SPEED OSCILLATIONS FOR PERIODS OF SEVERAL SECONDS. PUMP SPEED DECREASES WERE ON THE ORDER OF 30 RPM.</p> <p>VEHICLE EFFECT-NONE. THE EFFECT OF THE PUMP SPEED OSCILLATIONS WERE NOT REFLECTED IN SUSTAINER OPERATION.</p> <p>CORRECTIVE ACTION-DESIGN CHANGES BY ROCKETDYNE WHERE IN THE SUSTAINER GAS GENERATOR INJECTOR WAS EQUIPPED WITH A NO-METERING LOW POPPET. THE NEW DESIGN UTILIZES 24 DRILLED ORIFICES LOCATED UPSTREAM OF THE POPPET HEAT FOR METERING LOW FLOW TO THE COMBUSTOR.</p>							
PROPULSION-NA3-A/B SUSTAINER	AC-83-0004/32-807-810-75 SUSTAINER THRUST CHAMBER	CAPTIVE	737 630208	32/8YC 4.64	NO NO	NO ROCKETDYNE	890682
<p>FAILURE MODE-FAILED DURING OPERATION. SUSTAINER ENGINE DATA INDICATED A DETONATION IN THE ENGINE LOW DOME OR FUEL IN AN FOLD AREA AT BECO PLUS 0.333 SECONDS. POSSIBLE CAUSE WAS UNSTABLE MIXTURE RATIO AT CUTOFF DUE TO THE PROPELLANT VALVES HAVING NOT REACHED CONTROL BECAUSE OF SHORT DURATION OF TEST.</p> <p>SYSTEM EFFECT-LOSS OF STRUCTURAL INTEGRITY. SIX FUEL JACKET TUBE SPLITS IN THE CHAMBER THROAT AREA WERE NOTED DURING POST TEST INSPECTION.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-REPLACED SUSTAINER ENGINE.</p>							
PROPULSION-NA3-A/B SUSTAINER	AC-83-0001/32-805-80-75 B-NUTS	CAPTIVE	737 621126	32/8YC	YES NO	YES	890680
<p>FAILURE MODE-STRUCTURAL. POST TEST INSPECTION REVEALED 3 CRACKED B-NUTS AND 2 CRACKED B-NUT SLEEVES. POSSIBLY DUE TO STRESS CORROSION WHILE IN THE TORQUED CONDITION.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-B-NUTS AND SLEEVES WERE REPLACED.</p>							

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## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRJ OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MA3-A/B SUSTAINER	AQ182-0033/CB-802-00-13 LUBE OIL TUBE	FLIGHT	13F 081114	P2/MTR 09.5	NO NO	ROCKETDYNE	093148
<p>FAILURE MODE-STRUCTURAL. AS A RESULT OF THE EXPLOSION AT 10.4 SECONDS, IT IS BELIEVED THAT THE PNEUMATICS LINE TO P RESSURIZE THE SUSTAINER LUBE OIL RESERVOIR WAS DAMAGED AND THE LUBE OIL TANK WAS NOT PRESSURIZED.</p> <p>SYSTEM EFFECT-DEPLETION OF GAS SUPPLY. THIS LOSS OF HELIUM PRESSURE RESULTED IN FAILURE OF THE LUBE OIL SYSTEM TO P ROPERLY LUBRICATE THE SUSTAINER PUMP. THE PUMP THEN FAILED AT 09.8 SECONDS.</p> <p>VEHICLE EFFECT-MEDIUM SUSTAINER ENGINE SHUTDOWN. WHEN BOOSTER JETTISON OCCURRED THE VEHICLE BECAME UNSTABLE AS T HE RESULT OF NO SUSTAINER OPERATION.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>							
PROPULSION-MA3-A/B SUSTAINER	AQ182-0112/PI-801-00-18 VALVE-SERVO,	FLIGHT	10F 081107	11/ETR 0	NO NO	ROCKETDYNE	093587
<p>FAILURE MODE-OUT OF TOLERANCE. THE HEAD SUPPRESSION VALVE WAS BETWEEN 2 AND 3 DEGREES MORE OPEN THAN REQUIRED THROU SHOUT FLIGHT. THIS WAS CAUSED BY A 10 PSI ERROR IN THE CONTROLLER CHECKOUT KIT AT THE TIME THE M.S. CONTROLLER WAS C ALIBRATED.</p> <p>SYSTEM EFFECT-NONE-LOW FLOW RATE TENDED TO BE SLIGHTLY HIGH BUT THIS WAS CORRECTED BY THE PU VALVE. AT THEORETICAL LOW DEPLETION ONLY 139 POUNDS OF FUEL WOULD HAVE REMAINED.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE.</p>							
PROPULSION-MA3-A/B SUSTAINER	AQ182-0017/PA-401-00-113 PU VALVE LIP SEAL	PRF 290392	113D 080903	14/ETR	YES NO	ROCKETDYNE	093721
<p>FAILURE MODE-LEAK-EXTERNAL. AFTER FINAL TANKING FOR PRF, FUEL WAS DISCOVERED LEAKING FROM THE SUSTAINER ENGINE THRU ST CHAMBER.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED. PRF WAS SCRUBBED AND RESCHEDULED FOR 0/0/08.</p> <p>CORRECTIVE ACTION-THE 290392 PU VALVE LIP SEAL WAS REPLACED.</p>							
PROPULSION-MA3-A/B SUSTAINER	AQ182-0002/D01-991-00-07 LINES AND DUCTING	FLIGHT	07E 080713	P-1/MTR 0	YES NO		
<p>FAILURE MODE-OUT OF EXPECTED VALUE. ABNORMALLY LOW SUSTAINER ENGINE AREA TEMPERATURES, STARTING TO DECAY AT LIFTOFF AND REACHING A LOW OF -00 DEG F AT 175 SECONDS INDICATED A LOW LEAK IN THE SUSTAINER SYSTEM.</p>							

15 JUN 1966

GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PR1 OTM	VENDOR NAME VENDOR PART NO
	SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT. THE LOX LEAK CAUSED FREEZING OF CONTROLLING LINES WHICH CAUSED THE M3 VA LVE AND PROBABLY THE PU VALVE TO GO TO FULL OPEN POSITION. AT 66 SEC. THIS CAUSED ABNORMALLY HIGH SUSTAINER THRUST A ND SUBSEQUENT EARLY SUSTAINER CUTOFF. RESIDUAL THRUST WAS PRESENT FOR 43 SECONDS AFTER CUTOFF.					
	VEHICLE EFFECT-IMPROPER TRAJECTORY. THE FAILURE OF ONE OR BOTH PROPELLANT VALVES TO CLOSE AT SUSTAINER CUTOFF RESUL TED IN RESIDUAL THRUST AFTER CUTOFF. THIS CAUSED THE R/V TO OVERSHOOT THE TARGET.					
	CORRECTIVE ACTION-INSPECTION OF TORQUE PAINT ON THE LOX DRAIN LINE CHECK VALVE/LOX REGULATOR INTERFACE, CLAMPING LO X BOOT STRAP TUBE TO FUEL BOOT-STRAP LINE, AND AN INTERIM FIX CONSISTING OF INSTALLATION OF NEW PROOF TESTED CONTROL FUEL PRESSURE, M3 SERVO CONTROL VALVE, AND LOX AND FUEL SENSING FLEXIBLE LINES.					
PROPULSION-M3-A/B SUSTAINER	AC-82-0031/91-013-14-01 HEAD SUPPRESSION VALVE.	CAPTIVE	3F 820313	31/3YC 0.06	YES NO	
FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE IMPROPER OPERATION CONSISTED OF AN APPROXIMATE 350 MILLISECOND DELAY I N VALVE OPENING. THE MOST PROBABLE CAUSE OF VALVE OPENING DELAY (HESITATION AT THE FOUR DEGREE OPEN POSITION) WAS BMA FT SEIZURE RESULTING FROM FREEZING OF MOISTURE AND RUST IN THE VALVE IDLER SHAFT BEARING HOUSING ON THE OPPOSITE END OF THE SHAFT FROM THE VALVE ACTUATOR MECHANISM.						
SYSTEM EFFECT-EXPLOSION. WHEN THE VALVE BEGAN ITS OPENING MOVEMENT, THE SUSTAINER PUMP WAS AT ITS MAXIMUM SPIN CHAR GE SPEED. THE ABNORMAL LOADS THEREBY IMPOSED ON THE PUMP SHAFT PRODUCED SUFFICIENT SHAFT DEFLECTION TO ALLOW THE ROT ATING IMPELLER TO CONTACT THE PUMP CASE NEAR RING. THIS RUBBING CAUSED A FIRE WITHIN THE PUMP CASE WHICH CREATED SUF FICIENT INTERNAL PRESSURE TO FRACTURE THE PUMP VOLUME AT ITS PARTING LINE.						
VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. THE DAMAGE TO THE PROPELLANT AND HYDRAULIC DUCTING CREATED AN UNCONTROLLA BLE THRUST SECTION FIRE AND EXPLOSION OF THE MISSILE.						
CORRECTIVE ACTION-RED-F LINER ADDED TO SUSTAINER LOX PUMP INLET TO PRECLUDE PUMP RUBBING.						
PROPULSION-M3-A/B SUSTAINER	AE82-0352/82-601-A1-99 HYPERGOLIC CARTRIDGE CONTAINER B-W UT	CAPTIVE	39F 820424	3-2/3YC 4.71	YES ROCKETDYE NO	
FAILURE MODE-OUT OF TOLERANCE. THE B-NUT ON THE DISCHARGE PORT OF THE SUSTAINER ENGINE HYPERGOLIC CARTRIDGE CONTAIN ER WAS TORQUED TO ABOUT 80 IN-POUNDS. SPECIFIED TORQUE FOR THIS FITTING IS 130-180 IN-POUNDS. THE FITTING WAS FOUND TO LEAK UNDER 10 PSIG GAS PRESSURE.						
SYSTEM EFFECT-HIGH TEMPERATURE ENVIRONMENT. HYPERGOL LEAKING AT THE FITTING DURING THE SUSTAINER IGNITION START RES ULTED IN IGNITION AT THE PILOT, REDLINE MEASUREMENT, THERMO-COUPLE AND CREATED A LOCAL HIGH TEMPERATURE ENVIRONMENT. WH ITE RESIDUE WAS FOUND ON THE THERMOCOUPLE.						
VEHICLE EFFECT-PRMATURE PROPULSION CUTOFF. THE TEST WAS PRMATURELY TERMINATED BY THE PILOT OBSERVER WHEN THE TEM PERATURE EXCEEDED THE UPPER REDLINE LIMIT OF 250 DEG.						
CORRECTIVE ACTION-THE HYPERGOL CARTRIDGE DISCHARGE PORT B -NUT WAS OVERTORQUED WHILE ATTEMPTING TO REPAIR THE LEAK. THE FITTING AND THE DISCHARGE LINE PLANE WERE STRUCTURALLY DAMAGED AND BOTH ITEMS WERE REPLACED PER INS 100.						

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CONVAIR DIVISION

18 JUN 1968

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE RIF	PRI DIF	OTH DIF	VENDOR NAME VENDOR PART NO
PROPULSION-M43-A/B SUSTAINER	AE61-1289/P1-601-00-11 LOX PUMP	FLIGHT	11P 13/ETR 820409 0.97	YES	YES	ROCKETDYNE
<p>FAILURE MODE-FAIL DURING OPERATION. INTERNAL OVER- PRESSURE IN LOX PUMP BELIEVED CAUSED BY EXPLOSIVE COMBUSTION OF PUMP MATERIAL RESULTING FROM RUBBING BETWEEN ROTATING AND NON ROTATING PUMP COMPONENTS.</p> <p>SYSTEM EFFECT-EXPLOSION. INTERNAL EXPLOSION IN LOX PUMP RESULTED IN LOSS OF LOX SYSTEM INTEGRITY.</p> <p>VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. EXPLOSION LED TO A THRUST SECTION FIRE AND EVENTUALLY TO VEHICLE DESTRUCT ION.</p> <p>CORRECTIVE ACTION-ADDITION OF HEL-F LINER TO PUMP INLET TO PREVENT RUBBING OF METAL-TO-METAL.</p>						
PROPULSION-M43-A/B SUSTAINER	32-301-A1-02 366 COMBUSTOR LOX POPPET	CAPTIVE	42E 82/8YC 820111 19.22	YES	NO	
<p>FAILURE MODE-OUT OF TOLERANCE. OBSERVER CUTOFF WHEN THE 366 TEMPERATURE EXCEEDED REDLINE. SUBSEQUENT INVESTIGATION REVEALED THAT A DETONATION OCCURRED IN THE 366 CAUSING A STRETCHING OF THE LOX POPPET, RESULTING IN LOW FREQUENCY CH UGGING OF THE 66 AND A FAILURE OF A FAULTY WELD AT THE TURBINE INLET MANIFOLD.</p> <p>SYSTEM EFFECT-OPERATION TOO HIGH. THE STRETCHED LOX POPPET RESULTED IN INCREASED OPERATING PRESSURES AND LEVELS.</p> <p>VEHICLE EFFECT-A LOW LEVEL EXPLOSION AND FIRE FOLLOWED OBSERVER CUTOFF BY 1.5 SECONDS AS A DIRECT RESULT OF THE IGN ITION OF FUEL VAPORS WHICH WERE INTRODUCED INTO THE THRUST SECTION BY THE 366 STRUCTURAL FAILURE.</p> <p>CORRECTIVE ACTION-1. REVIEW RADIOGRAPHS OF THE TURBINE MANIFOLD ASSEMBLY WELDS. 2. INSTALLED M43-823 WHICH REDESIGN ED THE 366 LOX INJECTOR AND POPPET.</p>						
PROPULSION-M43-A/B SUSTAINER	AA61-0212/P1-580-01-34 PREVALVE	COMPOSITE-FRD/DPL	36E 611209	13/ETR	YES	NO
<p>FAILURE MODE-INTERNAL LEAK. WHEN SUSTAINER FUEL PRE-VALVE WAS CLOSED FOR THIRD TIME TO PERMIT REPLACEMENT OF VERMIE R FUEL CHECK VALVE FOR THIRD TIME, IT WAS NOTED THAT PRE-VALVE WOULD NOT SEAL. INVESTIGATION REVEALED TWO PIECES OF RUBBER SEAL WERE MISSING.</p> <p>SYSTEM EFFECT-CONTAMINATION. SUSTAINER FUEL SYSTEM CONTAMINATED BY PIECES OF SEAL.</p> <p>VEHICLE EFFECT-NONE. TANKING TEST WAS BEEN COMPLETED BEFORE PRE-VALVE WAS CLOSED TO REPLACE CHECK VALVE FOR THIRD T IME. ALL PIECES OF SEAL WERE FOUND AND PRE-VALVE REPLACED.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						

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CONVAIR DIVISION

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE OF TEST	DATE TIME OF TEST	PHI OTH	VEHICLE NAME VEHICLE PART NO
PROPULSION-MAS-A/B SUSTAINER	AE01-1108/P3-301-00-32 SUSTAINER LOX REGULATOR	FLIGHT	32E 011110	13/ETR -1	NO NO	ROCKETDYNE 097989
<p>FAILURE MODE-FAIL DURING OPERATION. REGULATOR WAS INSTRUMENTED TO BLUEPRINT WHICH WAS IN ERROR.</p> <p>SYSTEM EFFECT-OPERATION STOP PREMATURELY. THIS ERRONEOUS PLUMBING CAUSED LOX STARVATION TO THE 966 AND SUBSEQUENT LOSS OF SUSTAINER THRUST.</p> <p>VEHICLE EFFECT-PREMATURE SUSTAINER ENGINE SHUTDOWN. VEHICLE DESTROYED AT 34 SECONDS BY RANGE SAFETY OFFICER.</p> <p>CORRECTIVE ACTION-RE-NORM PRINT TO ENSURE PORT 603 IS UTILIZED.</p>						
PROPULSION-MAS-A/B SUSTAINER	AC-01-0090/32-303-A3-01 THRUST CHAMBER-INJECTION PLATE	CAPTIVE	5E 010927	32/SYC NO	YES NO	ROCKETDYNE 099030
<p>FAILURE MODE-STRUCTURAL-POST-RUN INSPECTION REVEALED ADDITIONAL EROSION IN COMPARISON TO RUN 22-504-A3-01 ON THE 9 SUSTAINER INJECTOR PLATE.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-THE SUSTAINER ENGINE WAS REPLACED PRIOR TO FURTHER TESTING.</p>						
PROPULSION-MAS-A/B SUSTAINER	AB-01-0080/14-013-H0 SUSTAINER 66 LOX REGULATOR FLOW SP COL POPPET	CAPTIVE	1-4F 010927	1-4/EDMA NO	YES NO	093771
<p>FAILURE MODE-PREMATURE OPERATION. REGULATOR FLOW SPOOL WAS IN THE FULL OPEN POSITION AT BOOSTER START. THE SPOOL MOVED TO THE FULL CLOSED POSITION PRIOR TO SUSTAINER START AND REMAINED FULL CLOSED UNTIL AFTER THE SUSTAINER START SIGNAL WAS GENERATED.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE.</p>						
PROPULSION-MAS-A/B SUSTAINER	AB-01-0010/14-012-H0 SUSTAINER 66 FUEL BLADE VALVE	CAPTIVE	1-4F 010929	1-4/EDMA NO	YES NO	093771
<p>FAILURE MODE-LEAK. INDICATION OF FUEL LEAKAGE DURING 0996 OPERATION, PRIOR TO 0996 TERMINATION.</p> <p>SYSTEM EFFECT-ERRATIC OPERATION.</p> <p>VEHICLE EFFECT-COUNTDOWN ABORTED. THE TEST WAS TERMINATED DUE TO REVERSE LEAKS IN THE 1/C CONNECTION, WHICH REFLECTED THE 01 66 COMBUSTION TEMPERATURE TO DEFLECT OFF-SCALE LOW AT IGNITION START.</p>						

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19 JUN 1969

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-THE BLADE VALVE ASSEMBLY WILL BE CHANGED PRIOR TO THE NEXT RUN.							099130
PROPULSION-WAS-A/B SUSTAINER	AC-61-0098/32-504-A3-01 THRUST CHAMBER-INJECTION PLATE	CAPTIVE	SE 610919	SE/STC	YES NO	YES ROCKETDOME	099029
FAILURE MODE-STRUCTURAL.-POST RUN INSPECTION REVEALED EVIDENCE OF SUSTAINER INJECTION PLATE EROSION. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-IT WAS RECOMMENDED THAT THE NEXT HOT FIRING BE LIMITED TO 12 SECONDS DURATION ON THE SUSTAINER ENGINE.							
PROPULSION-WAS-A/B SUSTAINER	AC-61-0098/31-809-A9-01 LUBE OIL TANK	CAPTIVE	1P 610910	9-1/STC 0.86	YES NO		099026
FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE SUSTAINER LUBE OIL PRESSURE MEASUREMENT INDICATED A SPIKE TO 846 PSIG. NORMAL RISE FOLLOWED. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-WAS-A/B SUSTAINER	AE61-0787/P3-501-00-28 TUBING	FLIGHT	282 610908	13/ETR 128.6	YES NO	YES ROCKETDOME	097580
FAILURE MODE-FAIL DURING OPERATION. BETWEEN 120.00 AND 120.09 SECONDS THE 846 FUEL BOOSTER LINE FAILED OR BLOCKAGE HAD PLUGGED THIS LINE.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. FUEL STARVATION TO THE 846 RESULT IN SHUTDOWN OF THE SUSTAINER ENGINE.							
VEHICLE EFFECT-PREMATURE SUSTAINER ENGINE SHUTDOWN. MISSION FAILED SHORTLY AFTER BOOSTER STAGING.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-WAS-A/B SUSTAINER	AE61-0841/P1-502-00-21 HEAD SUPPRESSION VALVE CONTROLLER	FLIGHT	212 610731	11/ETR 0.	NO NO		
FAILURE MODE-ERRATIC OPERATION-BECAUSE 3994 POUNDS OF BURNABLE LOX IN EXCESS OF THE NOMINAL 2.20 MIXTURE RATIO WERE INITIALLY TANKED, THE H3 VALVE OPENED TO ONLY 38 DEGREES RATHER THAN THE EXPECTED 45 DEGREES AND REMAINED AT THAT POSITION THROUGHOUT FLIGHT. CAUSED BY IMPROPER ADJUSTMENT OF H3 SERVO CONTROLLER PROBABLY DUE TO FAULTY CHECKOUT EQUIPMENT.							

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CONVAIR DIVISION

15 JUN 1966

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PRESENT OPERATION.						
SYSTEM EFFECT-OPERATION TOO LOW-THIS RESULTED IN A LOWER THAN NORMAL LOX FLOW RATE AND THE INITIAL LOX RICH CONDITION COULD NOT BE FULLY CORRECTED.						
VEHICLE EFFECT-NONE-SUFFICIENT BURNABLE PROPELLANTS REMAINED AT SUSTAINER CUTOFF FOR 10.76 SECONDS ADDITIONAL ENGINE OPERATION.						
CORRECTIVE ACTION-NB SERVOMOTOR VALVE CHECKOUT PROCEDURES WERE REVIEWED AND FOUND ACCEPTABLE TO NAA REQUIREMENTS. IF CHECKOUT OF NB CONTROLLER SETTING INDICATED ERROR GREATER THAN 10 PSI THE DESIGN GROUP WILL BE CONSULTED.						
PROPULSION-NAS-A/B SUSTAINER	04336/L2-402-00-97 SEAL	COUNTDOWN	97D 610702	PALCI-2	YES	ROCKETDYNE
FAILURE MODE-INTERNAL LEAK AT THE SUSTAINER FUEL TURBO PUMP NO. 4 SEAL.						
SYSTEM EFFECT-CONTAMINATION OF SUSTAINER FUEL TURBO PUMP.						
VEHICLE EFFECT-COUNTDOWN ABORTED.						
CORRECTIVE ACTION-SUSTAINER FUEL TURBO PUMP REPLACED.						
PROPULSION-NAS-A/B SUSTAINER	AB-61-0006/14-802-C8 MAIN LOX VALVE	CAPTIVE	1-4F 610416	1-4/EDMA RDS	YES	ROCKETDYNE
FAILURE MODE-INTERNAL LEAK. GAS OR WARM LOX PASSED THROUGH THE SUSTAINER AND B1 TURBO PUMPS APPROXIMATELY 1 SEC AFTER SUSTAINER ENGINE START.						
SYSTEM EFFECT-OPERATION TOO HIGH. PRESSURE SURGE IN THE SUSTAINER LOX PUMP.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-NAS-A/B SUSTAINER	AB-61-0004/14-801-A5 SCV FUEL BLADE VALVE	CAPTIVE	1-4F 610401	1-4/EDMA RDS	YES	ROCKETDYNE
FAILURE MODE-INTERNAL LEAK. FUEL LEAKAGE PAST THE BLADE VALVE DURING SPOG OPERATION.						
SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE. THE SCV FUEL BLADE VALVE WILL BE REPLACED PRIOR TO THE NEXT TEST.						

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CONTAIN DIVISION

## DIFFICULTIES REVIEW-POPULATION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH	VENDOR NAME VEHICLE PART NO
POPULATION-MAS-A/B SUSTAINER	AE 60-0936/P3-501-00-1-9 HEAD SUPPRESSION VALVE CONTROLLER	FLIGHT	9C 610224	18/CTR 0 TO 310	YES YES	092469
<p>FAILURE MODE-OUT OF TOLERANCE. FLIGHT DATA INDICATED THAT THE MS VALVE REMAINED AT 35 DEGREES DURING THE ENTIRE FLIGHT INSTEAD OF AT 41.8 DEGREES AS EXPECTED IN RESPONSE TO THE PU VALVE INDICATED LOW RICH (CLOSED) POSITION. THIS POSITION ERROR COULD HAVE BEEN CAUSED BY A FAULTY MS VALVE CONTROLLER OR COULD HAVE BEEN THE RESULT OF AN ERRONEOUS PU VALVE POSITION INDICATION.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW. THE FUEL FLOW EXPERIENCED WAS HIGHER THAN WOULD BE EXPECTED FOR THE LOW RICH CONDITION AT LIFT-OFF AND FOR THE PU VALVE POSITION RECORDED IN THE FLIGHT DATA WITH THE RESULT THAT THE LOW RICH CONDITION WAS NOT CORRECTED AS EXPECTED.</p> <p>VEHICLE EFFECT-NONE. SUFFICIENT BURNABLE PROPELLANTS REMAINED AT SUSTAINER CUT-OFF FOR AT LEAST 4.01 SECONDS OF ADDITIONAL ENGINE OPERATION.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
POPULATION-MAS-A/B SUSTAINER	AE60-0936/P3-501-00-09 CONTROLLER PU VALVE POSITION INDICATOR	FLIGHT	9C 610224	19/CTR 0 TO 310	YES YES	092469
<p>FAILURE MODE-ERRATIC OPERATION. FLIGHT DATA INDICATED THAT THE MS VALVE REMAINED AT 35 DEGREES DURING THE ENTIRE FLIGHT INSTEAD OF AT 41.8 DEGREES AS EXPECTED IN RESPONSE TO THE PU VALVE INDICATED LOW RICH (CLOSED) POSITION. THIS POSITION ERROR COULD HAVE BEEN CAUSED BY AN ERRONEOUS PU VALVE POSITION INDICATION OR BY A FAULTY MS VALVE CONTROLLER.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW. THE FUEL FLOW EXPERIENCED WAS HIGHER THAN WOULD BE EXPECTED FOR THE LOW RICH CONDITION AT LIFT-OFF AND FOR THE PU VALVE POSITION RECORDED IN THE FLIGHT DATA WITH THE RESULT THAT THE LOW RICH CONDITION WAS NOT CORRECTED AS EXPECTED.</p> <p>VEHICLE EFFECT-NONE. SUFFICIENT BURNABLE PROPELLANTS REMAINED AT SUSTAINER CUT-OFF FOR AT LEAST 4.01 SECONDS OF ADDITIONAL ENGINE OPERATION.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
POPULATION-MAS-A/B SUSTAINER	AC-61-0085/32-502-42-08 SUSTAINER ENGINE OXIDIZER REGULATOR	CAPTIVE	6E 610207	32/8YC NO	YES NO	096049
<p>FAILURE MODE-OUT OF SPECIFICATION. SUSTAINER ENGINE THRUST, CALCULATED TO SEA LEVEL CONDITIONS, WAS 33,410 LBS (MINUS 8.30 PCT) NOMINAL SUSTAINER THRUST IS 37,000 LBS (PLUS OR MINUS 3 PCT). THE SUSTAINER LOW REGULATOR WAS SET TOO LOW.</p> <p>SYSTEM EFFECT-OPERATION TOO LOW-SUSTAINER ENGINE PERFORMANCE WAS APPROXIMATELY 8 PCT LOW.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-THE LOW PERFORMANCE OF THE SUSTAINER WAS TO BE CORRECTED PRIOR TO THE NEXT FIRING BY READJUSTING THE LOW REGULATOR.</p>						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MA3-A/B SUSTAINER	AB-01-0001/14-033-03 FUEL BOOSTSTRAP LINE DRAIN FITTING O-RING	CAPTIVE	010115	1-4/EDMA RDS	YES NO	ROCKETDYNE
FAILURE MODE-LEAK, EXTERNAL. THE SUSTAINER FUEL BOOSTSTRAP LINE QUICK DISCONNECT DRAIN FITTING LEAKED DURING THE TEST DUE TO A FAULTY O-RING.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-FIRE. A SMALL FIRE RESULTED FROM THE LEAK WHICH DID MINOR WIRING DAMAGE.						
CORRECTIVE ACTION-REPLACED O-RING AND REPAIRED FIRE DAMAGE.						
PROPULSION-MA3-A/B SUSTAINER	AERO-0750/79-502-00-04	FLIGHT	4E 001129	13/ETZ 141.5	NO NO	
FAILURE MODE-ERRATIC OPERATION. SUSTAINER LOW PUMP INLET PRESSURE VARIATIONS CAUSED BY ABNORMAL VEHICLE OSCILLATIONS RESULTED IN ERRATIC PUMP SPEEDS AND DISCHARGE PRESSURES. THIS ERRATIC OPERATION WAS A SECONDARY RESULT OF LOSS OF VEHICLE STABILITY.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY. THE SUSTAINER ENGINE OPERATED ERRATICALLY AND EVENTUALLY SHUTDOWN PREMATURELY DUE TO ERRATIC PUMP OPERATION.						
VEHICLE EFFECT-PREMATURE SUSTAINER ENGINE SHUTDOWN. THE SUSTAINER ENGINE SHUTDOWN PREMATURELY DUE TO INCREASING AMP LITUDE OF SUSTAINER ENGINE CHAMBER PRESSURE OSCILLATIONS.						
CORRECTIVE ACTION-NONE.						
PROPULSION-MA3-A/B SUSTAINER	ETR-031/14-331-E3-SE SUSTAINER GAS GENERATOR BLADE VALVE E SEALS	CAPTIVE	001125	1-4/EDMA RDS	YES NO	ROCKETDYNE
FAILURE MODE-LEAK. THE FUEL SIDE OF THE 846 BLADE VALVE LEAKED DURING SP-60 OPERATION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE BLADE VALVE WAS REPLACED.						
PROPULSION-MA3-A/B SUSTAINER	ETR-029/14-520-03-SE SUSTAINER TURBINE SEAL	CAPTIVE	001103	1-4/EDMA RDS	YES NO	ROCKETDYNE
FAILURE MODE-LEAK EXTERNAL. POST-TEST INSPECTION DISCLOSED A HOT GAS LEAK AT THE SUSTAINER TURBINE OUTLET TO THE EXHAUST FLANGE.						
SYSTEM EFFECT-NONE.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
VEHICLE EFFECT-NONE.							002270
CORRECTIVE ACTION-THE SEAL WAS REPLACED.							
PROPULSION-WAS-A/B SUSTAINER	AC-60-0042/31-508-A1-03 SUSTAINER TURBOPUMP NO.4 BEARING P UEL COOLANT CHECKVALVE	CAPTIVE	DE 001014	SI/STC	YES NO		000007
FAILURE MODE-INTERNAL LEAK. FAULTY CHECK VALVE PERMITTED FUEL TO FLOW INTO THE SUSTAINER EXHAUSTERATOR.							
SYSTEM EFFECT-HIGH TEMPERATURE ENVIRONMENT. FIRE IN THE EXHAUSTERATOR DUE TO THE PRESENCE OF FUEL, HOWEVER NO DAMAGE OCCURRED.							
VEHICLE EFFECT- FIRE. SMALL FIRE OBSERVED AT ENGINE SHUTDOWN, BUT NO DAMAGE OCCURRED.							
CORRECTIVE ACTION-CHECK VALVE WAS REPLACED.							
PROPULSION-WAS-A/B SUSTAINER	AC-60-0042/31-505-A2-05 RCC ACCELEROMETER CONNECTOR	CAPTIVE	SE 001012	SI/STC 3.24	YES NO		000004
FAILURE MODE-PREATURE OPERATION. A LOOSE COAXIAL CABLE CONNECTION AT THE RCC ACCELEROMETER RESULTED IN REDUCED CIRCUIT IMPEDENCE.							
SYSTEM EFFECT-OPERATION STOPS PREMATURELY- ERRONEOUS RCC COUNT GENERATED RESULTING IN PREMATURE ENGINE SHUTDOWN.							
VEHICLE EFFECT-PREATURE SUSTAINER ENGINE SHUTDOWN- ABORTED HOT FIRING.							
CORRECTIVE ACTION-TIGHTENED RCC CONNECTOR.							
PROPULSION-WAS-A/B SUSTAINER	ETR-024/14-324-12-02 SUSTAINER GAS GENERATOR LOW POPPET	CAPTIVE	001007	1-4/EDMA RDS 0.6	YES NO		002201
FAILURE MODE-LEAK. THE SUSTAINER GAS GENERATOR INJECTION PRESSURE INDICATED HOT GAS LEAKAGE PAST THE LOW POPPET PRIOR TO OPENING THE BLADE VALVE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-WAS-A/B SUSTAINER	ETR-024/14-324-12-02 900 BLADE VALVE	CAPTIVE	001007	1-4/EDMA RDS	YES NO		
FAILURE MODE-LEAK. THE 900 BLADE VALVE LEAKED FUEL PRIOR TO OPENING THE VALVE.							
SYSTEM EFFECT-NONE.							

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
VEHICLE EFFECT-NONE. CORRECTIVE ACTION-UNKNOWN.							002203
PROPULSION-MAS-A/B SUSTAINER	AC-60-0037/32-311-AS-02 THRUST CHAMBER	CAPTIVE	ZE 001009	SE/STC	YES NO	YES ROCKETDYNE	000098
FAILURE MODE-LEAK-EXTERNAL- FIVE PIN HOLE LEAKS WERE FOUND APPROXIMATELY 8 INCHES BELOW THE INJECTOR FACE DURING POST FIRING INSPECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NECESSARY REPAIRS WERE MADE PRIOR TO SUBSEQUENT TESTS.							
PROPULSION-MAS-A/B SUSTAINER	ETR-021/14-317-ER-32 SUSTAINER GAS GENERATOR TURBINE SP IN CHARGE	CAPTIVE	000817	1-4/EDMA RDS 0.84	YES NO	YES ROCKETDYNE	001475
FAILURE MODE-FAIL DURING OPERATION. THE SPIN CHARGE EXPLODED DURING THE SUSTAINER START SEQUENCE DUE TO IMPROPER GROUNDING.							
SYSTEM EFFECT-OPERATION DOES NOT START. THE SUSTAINER AND VERNIER ENGINES DID NOT START. THE SUSTAINER THRUST CHAMBER SUFFERED OVERHEATING DAMAGE AND THE LME INBOARD WAS DAMAGED BY FRAGMENTS FROM THE SPIN CHARGE.							
VEHICLE EFFECT-PRERATURE PROPULSION CUTOFF. THE TEST WAS TERMINATED BY OBSERVER CUTOFF.							
CORRECTIVE ACTION-THE SPIN CHARGE WAS INCORRECTLY GROUNDED WHEN MODIFIED FROM THE SCREEN-IN TYPE TO THE FLANGE TYPE. THE REMAINING SPIN CHARGES OF THIS TYPE WERE INSPECTED BY THE VENDOR. THE NECESSARY REPAIRS WERE MADE TO THE SUSTAINER ENGINE AND OTHER HARDWARE.							
PROPULSION-MAS-A/B SUSTAINER	AC-60-0030/32-303-AS-02 SUSTAINER HEAD SUPPRESSION VALVE	CAPTIVE	ZE 000813	SE/STC	YES NO	YES ROCKETDYNE	001474
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE M. S. VALVE STARTED TO OPEN AT THE PROPER TIME THEN HUNG-UP AT 4 DEGREES FOR 0.05 SECOND WHICH DELAYED THE START SEQUENCE. INSPECTION OF THE M.S. VALVE ACTUATOR REVEALED THE PRESENCE OF WATER.							
SYSTEM EFFECT-OPERATION STARTS TOO LATE. THE TURBINE SPINNER BURNED OUT AND THE SUSTAINER ENGINE FAILED TO START.							
VEHICLE EFFECT-PRERATURE PROPULSION CUTOFF. THE TEST WAS TERMINATED BY AN OBSERVER CUTOFF.							
CORRECTIVE ACTION-THE M.S. VALVE, IGNITER FUEL VALVE, AND SUSTAINER HYDRAULIC CONTROL MANIFOLD PACKAGE WERE REPLACED.							
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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PR1 DIP	PR2 DIP	VEHICLE NAME PART NO
PROPULSION-MAS-A/S SUSTAINER	ETR-050/14-318-02-DE SUSTAINER THRUST CHAMBER TUBES	CAPTIVE	600811	1-4/EDM	YES	ROCKETDYNE	602260
FAILURE MODE-STRUCTURAL. POST-TEST INSPECTION REVEALED SEVERAL SPLIT FUEL TUBES AND PIN HOLE LEAKS IN THE CHAMBER.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE CHAMBER WAS REPAIRED BY SILVER SOLDERING THE SPLITS AND PREWATERING THE PIN HOLES.							
PROPULSION-MAS-A/S SUSTAINER	ETR-018/14-318-02-DE GAS GENERATOR LOW REGULATOR	CAPTIVE	600780	1-4/EDM	YES	ROCKETDYNE	602231
FAILURE MODE-ERRATIC OPERATION. REGULATOR DISCHARGE PRESSURE INDICATED 100 PSI PEAK-TO-PEAK OSCILLATIONS PRIOR TO CUTOFF.							
SYSTEM EFFECT-ERRATIC OPERATION. RELATED G.O. PARAMETERS REFLECTED THE OSCILLATIONS.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REGULATOR WAS REPLACED.							
PROPULSION-MAS-A/S SUSTAINER	AC-60-0033/32-308-A3-02 SUSTAINER LUBE OIL MANIFOLD, PRESSURE SENSING LINE	CAPTIVE	600309	32/STC	YES	ROCKETDYNE	602267
FAILURE MODE-OUT OF TOLERANCE. SUSTAINER LUBE OIL DID NOT REACH THE MINIMUM REG-LINE REQUIREMENT. THE SENSING LINE WAS CONTAMINATED WITH PIECES OF AN O-RING SEAL.							
SYSTEM EFFECT-OPERATION TOO LOW.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-MAS-A/S VERNIER	60A-AP284-002/01-801-00-35 THRUST CHAMBER	FLIGHT	34F 640031	01/MTZ 301	YES	NO	
FAILURE MODE-ERRATIC OPERATION. BOTH VERNIER THRUST CHAMBER PRESSURES DECAYED FROM 308 PSIA TO 208 PSIA AND RECOVERED TO 302 PSIA BETWEEN 200.5 TO 201.4 SECONDS. DECAYS NOT REFLECTED IN ENGINE TANK PRESSURES.							
SYSTEM EFFECT-OPERATION TOO LOW.							
VEHICLE EFFECT-NONE.							

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-NO CORRECTIVE ACTION TAKEN.						
PROPULSION-M43-A/B VERNIER	A403-0043/P1-002-00-130 VERNIER ENGINE FOR SUPPLY CHECK VA LVE	COUNTDOWN	1307 031000	11/ETR -18700	YES NO	
FAILURE MODE-STRUCTURAL. VERNIER ENGINE FOR SUPPLY CHECK VALVE WAS POA TO BE SCRATCHED DURING FINAL THRUST SECTION INSPECTION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-COUNTDOWN DELAYED. START OF COUNTDOWN WAS DELAYED 43 MINUTES TO REPLACE VALVE.						
CORRECTIVE ACTION-VALVE REPLACED. CAUSE OF SCRATCHES UNKNOWN.						
PROPULSION-M43-A/B VERNIER	AC-03-0003/22-000-001-73 B-NUT, FUEL SUPPLY LINE	CAPTIVE 27-24007-9	75P 030302	22/ETC NO	YES NO	
FAILURE MODE-STRUCTURAL. POST TEST INVESTIGATION REVEALED A 3/16 INCH CRACK ON THE V1 FUEL SUPPLY LINE 8-INCH AT THE PROPELLANT VALVE END.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE						
CORRECTIVE ACTION-THE LINE WAS REPLACED.						
PROPULSION-M43-A/B VERNIER	T-002-571-0-2500/P1-00M-01-134 FUELLINE/PROPELLANT VALVE, B-NUT	COUNTDOWN 27-24007-9	134P 020010	11/ETR NO	YES NO	
FAILURE MODE-LEAK EXTERNAL. DURING FUEL TAKING A SEEPING LEAK DEVELOPED AT THE B-NUT CONNECTION TO THE VERNIER ; P PROPELLANT VALVE.						
VEHICLE EFFECT-COUNTDOWN DELAYED.						
CORRECTIVE ACTION-THE B-NUT ON THE PROPELLANT VALVE LINE WAS RETORNIED PER SPECIFICATION. LEAK WAS STOPPED.						
PROPULSION-M43-A/B VERNIER	A402-0070/01-004-00-04 VERNIER PROPELLANT VALVES	FLIGHT	042 020220	0017-1 131	NO NO	
FAILURE MODE-PREMIATURE OPERATION. VERNIER ENGINE SHUTDOWN OCCURRED WHEN THE VERNIER PROPELLANT VALVES CLOSED DUE TO INSUFFICIENT PNEUMATIC OPENING PRESSURE.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.						
VEHICLE EFFECT-LOSS OF VEHICLE STABILITY.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTM	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-NONE.							007001
PROPULSION-HA3-A/B VERNIER	A-80-00-107 NONFLEXIBLE, V/VELO SUPPLY BELLOW	PAR 27-02404-803	SC 020128	FACTORY	YES NO	FLEXIBLE METAL HOSE	009207
FAILURE MODE-STRUCTURAL. UNIT SELECTED FOR EXTERNAL LEAKAGE WHICH WAS CONFIRMED AND CAUSED BY FLEXING BEYOND THE END DRAINAGE LIMIT OF THE BELLOW MATERIAL.							
CORRECTIVE ACTION-ETP 1330 AUTHORIZED REDESIGN RELEASED 3-3-62 AS P/N 27-02423-3.							
PROPULSION-HA3-A/B VERNIER	A481-021, P/B-SBH-01-36 CHECK VALVE	COMPOSITE-FRD/DPL 27-02402-3	SAE 011208	13/CTR	YES NO		009240
FAILURE MODE-LEAK-EXTERNAL. DURING FUEL TANKING, EXCESSIVE FUEL LEAKED PAST VERNIER ENGINE FUEL CHECK VALVE END FITTING. INVESTIGATION SHOWED CRACKS FROM SAFETY WIRE HOLER INWARD TOWARD VALVE BODY.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COMPOSITE DELAYED. TANKING TEST DELAYED TO REPLACE CHECK VALVE. REPLACEMENT VALVE ALSO LEAKED EXCESSIVELY AND WAS REPLACED. THIRD VALVE ACCEPTABLE.							
CORRECTIVE ACTION-UNKNOWN. OPERATIONS REPORT WRITTEN AGAINST LEAKING VALVES.							
PROPULSION-HA3-A/B VERNIER	AC-01-0096782-303-A3-01 VERNIER CONTROL PRESSURE REGULATOR	CAPTIVE	SC 010918	82/8YC -240	YES NO		009030
FAILURE MODE-FAILED DURING OPERATION. VERNIER CONTROL MANIFOLD REGULATOR DISCHARGE PRESSURE EXHIBITED A TRANSIENT INCREASE WHEN THE SUSTAINER CONTROLS BOTTLE WAS PRESSURIZED. THE MAXIMUM PRESSURE OBTAINED WAS IN EXCESS OF THE RECORDER LIMIT OF 800 PSIG.							
SYSTEM EFFECT-OPERATION TOO HIGH.							
VEHICLE EFFECT-COUNTDOWN ABORTED.							
CORRECTIVE ACTION-REPLACED THE VERNIER CONTROL REGULATOR PRIOR TO RUN 804.							
PROPULSION-HA3-A/B VERNIER	AC-01-0096782-303-A3-06 LOW TANK PRESSURIZING CHECK VALVE	CAPTIVE	SC 010918	82/8YC	YES NO	P-33E70	
FAILURE MODE-FAILED TO OPERATE. THE VERNIER LOW TANK PRESSURIZATION CHECK VALVE MALFUNCTIONED BY ALLOWING REVERSE FLOW LEAKAGE. THIS RESULTED IN LOW PRESSURE THAN THE PNEUMATIC MANIFOLD AND INTO THE VERNIER FUEL TANK. AS A CONSEQUENCE VERNIER FUEL TANK PRESSURE INCREASED ABOVE FUEL SUPPLY PRESSURE AND FLOW OUT THE SOLO TANK WAS INITIATED.							

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## DIFFICULTIES REVIEW-PROPELLION SYSTEM-ALIGNING

SYSTEM	TEST/REPORT NUMBER	SIF DATA SOURCE	VEHICLE	SITE	PRI	NUMBER
SUB-SYSTEM	FAILED COMPONENT NAME	PART NUMBER	DATE	TIME	OTH	PART NO
SYSTEM EFFECT-EXPLOSION.						
VEHICLE EFFECT-LOSS OF VEHICLE INTEGRITY. THE EXPLOSION CAUSED IMMEDIATE DESTRUCTION OF THE VEHICLE FORWARD OF STAY 10110.						
CORRECTIVE ACTION-DOUBLE CHECK VALVES WERE INSTALLED IN THE PRESSURIZATION LINE.						
PROPELLION-MA3-A/B	AS-66-0000/70-200-40-00	CAPTIVE	WE	06/07C	YES	
VERNIER	VERNIER CHAMBER		06/007	104	NO	
FAILURE MODE-OUT OF EXPECTED TEST VALUE. UNUSUAL VERNIER CUTOFF CHARACTERISTICS NOT PREVIOUSLY OBSERVED ON STANDBY SERIES TESTING WERE NOTED THE CAUSE OF THE SYSTEM EFFECT IS UNKNOWN HOWEVER IT IS SUSPECTED TO BE A FUNCTION OF THE PULSE SEQUENCE.						
SYSTEM EFFECT-ERRATIC OPERATION-FOLLOWING AN UNUSUALLY SHARP CHAMBER PRESSURE DECAY, BOTH VERNIER CHAMBERS INDICATED A SLIGHT PRESSURE RISE 1.5 SECONDS AFTER CUTOFF.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPELLION-MA3-A/B	AC-60-0050/31-311-A7-08	CAPTIVE	WE	31/07C	YES	
VERNIER	VELOPEE LINE, 8-NUTS		001125		NO	
FAILURE MODE-STRUCTURAL- TWO (2) CRACKED 5 NUTS WERE DISCOVERED DURING POST TEST SECURING.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPELLION-MA3-A/B	AS60-0342/P3-203-00-03	FLIGHT	WE	13/07R	NO	
VERNIER	LIQUID OXYGEN VERNIER SUPPLY LINE		001110	142	NO	
FAILURE MODE-FAIL DURING OPERATION. A VERNIER LIQUID OXYGEN SUPPLY LINE RUPTURED DUE TO EXCESSIVE ROLL OR VIBRATION RESULTING FROM LOSS OF STAINER AND VERNIER ENGINE HYDRAULIC ACTUATING PRESSURE AFTER BOOSTER STAGING.						
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. THE LIQUID OXYGEN LINE BETWEEN ONE VERNIER ENGINE AND THE COMMON VERNIER LINE RUPTURED CAUSING IMMEDIATE LOX STARVATION AT THE ENGINE CONCERNED. THE OTHER ENGINE OPERATED AT PARTIAL THRUST UNTIL DEPLETION OF THE VERNIER LOX TANK. LOSS OF BACK PRESSURE IN THE VERNIER SUPPLY LINE CAUSED AN INCREASE IN FLOW FROM THE SUBSTAINED LOX REGULATOR TO THE VERNIER SYSTEM RESULTING IN LOX STARVATION AT THE SUBSTAINED GAS GENERATOR.						
VEHICLE EFFECT-REDUCTION IN PROPELLION SYSTEM. LIQUID OXYGEN STARVATION CAUSED BY LEAKAGE FROM ONE OF THE VERNIER SUPPLY LINES RESULTED IN REDUCED VERNIER ENGINE THRUST FOLLOWED BY SUBSTAINED GAS GENERATOR THRUST WHEN THRUST WAS MAINTAINED ENGINE OPERATION.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-IMPROVED DESIGN OF SUBTAINER/VERNIER HYDRAULIC SYSTEM TO PRECLUDE EXCESSIVE ROLL ON VIBRATION.							000110
PROPULSION-M3-A/B VERNIER	ETR-025/14-225-12-2E VERNIER HYPERCOL CARTRIDGE DIAPHRAGM GM	CAPTIVE	001103	1-4/EDNA YES RDS	NO	ROCKETDYNE	000274
FAILURE MODE-FAILED DURING OPERATION. THE V1 HYPERCOL DIAPHRAGM TORE LOOSE DURING THE TESTS.							
SYSTEM EFFECT-CONTAMINATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M3-A/B VERNIER	ETR-025/14-225-12-2E VERNIER HYPERCOL CARTRIDGE DIAPHRAGM GM	CAPTIVE	001013	1-4/EDNA YES RDS	NO	ROCKETDYNE	000273
FAILURE MODE-FAILED DURING OPERATION. THE V2 HYPERCOL DIAPHRAGM TORE LOOSE AND LOOSED IN THE LOWER PART OF THE HYPERCOL CARTRIDGE.							
SYSTEM EFFECT-CONTAMINATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M3-A/B VERNIER	ETR-025/14-225-12-2E VERNIER HYPERCOL CARTRIDGE DIAPHRAGM GM	CAPTIVE	001007	1-4/EDNA YES RDS	NO	ROCKETDYNE	000281
FAILURE MODE-FAIL DURING OPERATION. THE V2 HYPERCOL DIAPHRAGM TORE LOOSE AND LOOSED IN THE LOWER PART OF THE HYPERCOL CARTRIDGE.							
SYSTEM EFFECT-CONTAMINATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-M3-A/B VERNIER	ETR-025/14-225-12-2E VERNIER LOW PRESS LINE RUPTURE DISC 27-24003-13	CAPTIVE	001003	1-4/EDNA YES RDS	NO	ROCKETDYNE	
FAILURE MODE-STRUCTURAL. THE RUPTURE DISC TORE LOOSE AND LOOSED DOWN STREAM IN THE SUPPLY LINE.							
SYSTEM EFFECT-CONTAMINATION.							
VEHICLE EFFECT-NONE.							

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MAS-A/B VERNIER	ETR-823/14-823-W8-DE VERNIER HYPEROL CARTRIDGE DIAPHRAGM	CAPTIVE	801009	1-4/EDMA RDS	YES NO	ROCKETDYNE NO 800996
FAILURE MODE-FAIL DURING OPERATION. THE V1 HYPEROL DIAPHRAGM TORN LOOSE AND LOOSED IN THE LOWER PART OF THE HYPEROL CARTRIDGE.						
SYSTEM EFFECT-CONTAMINATION.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MAS-A/B VERNIER	AES0-0049/PC-SC0-02-000 CIRCUIT BOARD	COMPOSITE-FACTORY	800980	FACTORY	NO NO	
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME- AT T+289 THE VERNIER CUTOFF LAMP DID NOT ILLUMINATE, THE VERNIER C CONTROL LAMP DID NOT EXTINGUISH AND THE SOLO TANK PRESSURE LAMP DID NOT EXTINGUISH. ALL CAUSED BY A FAULTY VERNIER CUTOFF LOGIC BOARD IN THE A/B PROGRAMMER.						
SYSTEM EFFECT-OPERATION DOES NOT START- PROPULSION SYSTEM DID NOT RECEIVE VERNIER CUTOFF SIGNAL.						
VEHICLE EFFECT-COMPOSITE RECOMMENDED. COMPOSITE RE-BAW.						
CORRECTIVE ACTION-THE VERNIER CUTOFF LOGIC BOARD WAS REPLACED IN THE PROGRAMMER.						
PROPULSION-MAS-A/B VERNIER	AC-60-0028/82-501-A1-02 VERNIER CONTROL SOLENOID, PIN	CAPTIVE	22	82/8YC	YES NO	ROCKETDYNE
FAILURE MODE-SHORT, ELECTRICAL. THE HOT PIN (PIN A) OF CONTROL SOLENOID WAS GROUNDED TO THE CASE OF PLUG P06.						
SYSTEM EFFECT-OPERATION DOES NOT START.						
VEHICLE EFFECT-PREATURE VERNIER ENGINE CUTOFF.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MAS-A/B VERNIER	MS141-0-8-21/PC-8CO-01-823 SOLO TANKS	COMPOSITE-FACTORY	DIP	FACTORY	NO NO	
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME-SOLO TANK PRESSURIZATION WAS NOT INDICATED ON THE CONTROL LAMP AT 3.20 SECONDS AND AT 8.45 SECONDS. TROUBLE CAUSED BY LOOSE CONNECTION IN A/B.						
SYSTEM EFFECT-OPERATION DOES NOT START-NO INDICATION OF SOLO TANKS PRESSURIZATION. PROBLEM CAUSED BY LOOSE CONNECTIONS.						

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO
ON IN AGE.						
VEHICLE EFFECT-COMPOSITE RE-SCHEDULED. SATISFACTORY RE-RUN OF COMPOSITE MADE.						
CORRECTIVE ACTION-LOOSE CONNECTION IN AGE WAS REPAIRED.						
PROPULSION-WAS-A/B GENERAL	WASAS-10ME/P1-COR-00-136 TANK	FLIGHT	1367 631086	11/4TH 242	NO NO	NO NO
FAILURE MODE-FAIL DURING OPERATION. FROM 242 TO 243 SECONDS, SUSTAINER ENGINE AND VERNIER BOLO FUEL TANK PRESSURES 9 ATA DEMONSTRATED INCREASES AND OSCILLATIONS. THESE WERE PRECEDING BY DECREASES IN THE VERNIER LOX AND FUEL TANKS AND THE WE CHAMBER PRESSURES.						
SYSTEM EFFECT-ERRATIC OPERATION- PRIOR TO THIS ANOMALY, THE PROPULSION SYSTEM HAD BEEN AFFECTED BY A PREVIOUS HYDRAULIC FAILURE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-WAS-A/B GENERAL	AJ42-0033/02-002-00-13 TURBO-PUMP	FLIGHT	137 621114	01/4TH 19.4	YES NO	YES NO
FAILURE MODE-LEAK-EXTERNAL. A LEAK EVIDENTLY IN THE PROPULSION SYSTEM OCCURED AND FIRE WAS EVIDENT AT 19.4 SECONDS FOLLOWED BY AN EXPLOSION AT 19.83 SECONDS. CAUSE OR SOURCE OF THE FIRE AND EXPLOSION IS UNKNOWN.						
SYSTEM EFFECT-EXPLOSION. INDIRECT EFFECT ON SUSTAINER TURBOPUMP. THE EXPLOSION POSSIBLY CAUSED LOSS OF THE MEDIUM P RESERVOIR LINE TO THE SUSTAINER LUBE OIL RESERVOIR. THIS IN TURN CAUSED IMPROPER LUBRICATION TO THE SUSTAINER PUMP AND SUBSEQUENT PUMP SHUTDOWN AT 93.5 SECONDS.						
VEHICLE EFFECT-LOSS OF VEHICLE STABILITY. STABILITY OF THE VEHICLE WAS LOST WHEN BOOSTER CUTOFF WAS INITIATED.						
CORRECTIVE ACTION-NONE.						
PROPULSION-WAS-A/B GENERAL	A081-0000/WAS107/01-002-04-24 GAS GENERATOR	COMPOSITE-PRO/OPPL	242 610902	7/4TH	NO NO	NO NO
FAILURE MODE-FAILED TO OPERATE AT PRESCRIBED TIME. GAS GENERATOR INITIATOR SIMULATOR DID NOT ALLOW FIRING OF INITIATOR AS SIMULATOR WAS NOT COMPATIBLE WITH LAUNCH CONTROL SYSTEM.						
SYSTEM EFFECT-OPERATION DOES NOT START. SP90 INITIATORS DID NOT FIRE.						
VEHICLE EFFECT-COMPOSITE DELAYED.						
CORRECTIVE ACTION-UNKNOWN						

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## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE OF TEST	ALTE TIME OF TEST	PRE: VEHICLE NAME VEHICLE PART NO
PROPUSSION-WA3-A/B GENERAL	AC-81-0099/81-008-A6-01 THRUST CHAMBERS	CAPTIVE	3P 610810	8-1/8YC YES	ROCKETDYNE NO
FAILURE MODE-OUT OF SPECIFICATION. THE B1, B2, AND SUSTAINER THRUST LEVELS WERE 8.8, 4.8, AND 8.7 PERCENT BELOW NOMINAL THRUST, RESPECTIVELY. ALLOWABLE THRUST DEVIATION IS 3 PERCENT.					
SYSTEM EFFECT-OPERATION TOO LOW.					
VEHICLE EFFECT-NONE.					
CORRECTIVE ACTION-UNKNOWN.					
PROPUSSION-WA3-A/B GENERAL	AE60-0338/P1-402-00-80 RELAY BOX, CIRCUITRY	FLIGHT	600 600702	11/2YR IS	YES NO
FAILURE MODE-ERRATIC OPERATION INTERMITTENT SHORT IN WIRING OF ENGINE RELAY BOX OR ASSOCIATED HARNESS. SIMILAR SHORTING PROBLEM WAS OBSERVED DURING PRIOR VERNIER ENGINE LEAK CHECK TEST.					
SYSTEM EFFECT-ERRATIC OPERATION INTERMITTENT CAUSED ERRATIC CLOSURE OF RELAY THAT CONTROLS PRESSURIZATION AND VENTING OF THE VERNIER ENGINE PROPELLANT TANKS.					
VEHICLE EFFECT-IMPROPER TRAJECTORY. REPEATED PRESSURIZATION AND VENTING OF THE VERNIER TANKS CAUSED DETERIORATION OF BOOSTER. SUSTAINER AND VERNIER ENGINE PERFORMANCE WITH CUTOFF AT A VELOCITY INSUFFICIENT TO REACH THE TARGET.					
CORRECTIVE ACTION-INCREASED INSTRUMENTATION ON LATER TESTS TO CHECK SIGNALS FROM PROGRAMMER.					
PROPUSSION-WA3-A/B BOOSTER	574-3-66-23 TURBINE PUMP	FLIGHT	7117 640418	PALCE-4 28.5	YES NO
FAILURE MODE-FAIL DURING OPERATION. B2 CHAMBER PRESSURE AND PUMP SPEED DECREASED 8 PSI AND 37 RPM RESPECTIVELY. SUSPECT MODE IS CONTAMINATION OF A TURBINE NOZZLE.					
SYSTEM EFFECT-OPERATION TOO LOW.					
VEHICLE EFFECT-NONE.					
CORRECTIVE ACTION-OPEN- INVESTIGATION IS BEING PERFORMED TO DETERMINE EXACT FAILURE MODE.					
PROPUSSION-WA3-A/B BOOSTER	574-3-66-27	FLIGHT	1340 640487	300 YES	YES YES
FAILURE MODE-OUT OF TOLERANCE. THE PU SYSTEM WAS UNABLE TO CORRECT FOR A LOW RICH ERROR ALTHOUGH ITS OPERATION WAS PROPER. INCO OCCURRED 8 SECONDS EARLY AS THE RESULT OF FUEL DEPLETION. LEAKAGE OR FUEL RICH BURNING OF THE BOOSTER & MAINS ARE POSSIBLE CAUSES.					
SYSTEM EFFECT-REDUCED FUEL DEPLETION.					

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYS- SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	JITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
	VEHICLE EFFECT-PRIMEUR ENGINE CUTOFF ALTHOUGH MISSION REQUIREMENTS WERE MET. CORRECTIVE ACTION-OPEN-INVESTIGATION IS BEING PERFORMED TO DETERMINE IF PRIMARY CAUSE IS LEAKAGE OR FUEL RICH BURNING OF THE BOOSTER ENGINES.						000410
PROPULSION-MAS-A/B BOOSTER	A-90-06-3010 PLENHORE	FAR	960 000311	WTR	YES NO	RESISTOR/LEX NO 23600CCN-18-01 00	000000
FAILURE MODE-STRUCTURAL. FIELD PERSONNEL REPORTED OBSERVING A ONE-HALF INCH CRACK IN THE HOSE LINER AFTER IT WAS REMOVED FROM STOCK FOR INSTALLATION ON VEHICLE 960.							
CORRECTIVE ACTION-FAILURE WAS NOT CONFIRMED. THE HOSE LINER WAS NOT CRACKED OR BPLIT. THE LINER DEFECTS ENCOUNTERED PROBABLY RESULTED FROM A MIX AND EXTRUSION ANOMOLY THAT COULD NOT BE PIN POINTED BY THE MANUFACTURER. HOSE REPLACED. ROCKETOYNE WAS MAJOR DESIGN CHANGE FOR THIS HOSE APPROVED BY THE AIRFORCE.							000377
PROPULSION-MAS-A/B BOOSTER	LA-790-01-7116 VALVE-CHECK	COMPOSITE-PRD/DPL	7116 000309	PALC 2-6	YES NO		
FAILURE MODE-DURING THE POST DPL CRYOGENIC LEAK CHECK TWO LEAKS WERE DETECTED AT THE BOOSTER LOX MANIFOLD. THE LEAKS WERE AT THE FILL AND CHECK VALVE AND AT THE BOOSTER CHECK VALVE.							
SYSTEM EFFECT-LOW THERMAL ENVIRONMENT.							
VEHICLE EFFECT-TEST RESCHEDULE.							
CORRECTIVE ACTION-THE SEALS FOR BOTH VALVES WERE REPLACED.							
PROPULSION-MAS-A/B BOOSTER	A1-490-01-503 REGULATOR-GAS	COMPOSITE-PRD/DPL	3030 000224	ABREDA-1	YES NO		000000
FAILURE MODE-ERRATIC OPERATION. THE BOOSTER LOX REFERENCE REGULATOR DISPLAYED EXCESSIVE PRESSURE OSCILLATION AFTER PREARMING AND VENTING OF STRET TANKS.							
SYSTEM EFFECT-ERRATIC OPERATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE REGULATOR WAS REPLACED.							

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DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-NA3-A/B BOOSTER	GOC/BAF83-070/32-401-00-93 866 OXIDIZER LIQUID REGULATOR	FLIGHT	850 851220	8-2/MTA	YES NO	ROCKETDIME NO 303911	090330
<p>FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE BOOSTER ENGINE SYSTEM PARAMETERS INDICATED AN ABNORMAL PERFORMANCE INC BLAME DURING BOOSTER PHASE. ROCKETDIME STUDY SUGGESTS MALFUNCTION OF 66 OXIDIZER PRESSURE REGULATOR AS CAUSE OF PERFORMANCE CHANGE. A MALFUNCTION OF THE REGULATOR WOULD IN EFFECT CONVERT THE ENGINE TO AN ORIPICED SYSTEM AND PERMIT PERFORMANCE TO VARY WITH THE CHANGES IN PROPELLANT HEAD INDUCED BY INCREASING ACCELERATION.</p> <p>SYSTEM EFFECT-OPERATION TOO HIGH. REGULATOR MALFUNCTION PRECLUDED CORRECTION OF PROPELLANT HEAD CHANGES RESULTING FROM INCREASING ACCELERATION.</p> <p>VEHICLE EFFECT-NONE. RE-ENTRY VEHICLE WAS PROPERLY PLACED TO PROVIDE THE DESIRED IMPACT.</p> <p>CORRECTIVE ACTION-ROCKETDIME REQUESTING FUNDS FROM 860 TO CONTINUE INVESTIGATION.</p>							
PROPULSION-NA3-A/B BOOSTER	CT-98-08-196 FUEL DUCT	FAR 7-23419-001	1740 851209	308	YES NO	60/C	090430
<p>FAILURE MODE-EXTERNAL LEAK. LEAKAGE REPORTED TO BE ONE DROP PER MINUTE WITH THE VEHICLE AT STAGE ONE PRESSURE.</p> <p>CORRECTIVE ACTION-CONFIRMED FAILURE. DUCT FAILED AT AN AREA THINNED BY DIMPLES IN BOTH SIDES OF THE PARENT MATERIAL. DIMPLES WERE CAUSED BY WELDING. 60/C TO IMPROVE WELDING AND X-RAY INSPECTION TECHNIQUES.</p>							
PROPULSION-NA3-A/B BOOSTER	GOC/BAF83-087/LA-701-00-7113 866 LOZ SUPPLY LINE	FLIGHT	7113 851108	2-4/PALC -30	YES YES		900000
<p>FAILURE MODE-LEAK EXTERNAL. LOZ LEAKAGE AT POSSIBLY THE 866 LOZ SUPPLY LINE FROM REGULATOR.</p> <p>SYSTEM EFFECT-NONE. SYSTEM OPERATION, AS INDICATED BY FLIGHT DATA, WAS NORMAL. LOZ LEAKAGE TOO SMALL TO EFFECT PROPELLION SYSTEM OPERATION OR DETECTABLE IN ENGINE DATA.</p> <p>VEHICLE EFFECT-NONE. LOZ LEAKAGE WAS REFLECTED IN LOW ENGINE COMPARTMENT TEMPERATURE DATA DURING COUNTDOWN AND FLIGHT ALSO EVIDENCE WAS INDICATED IN A PROCEED HYDRAULIC INSTRUMENTATION SENSITIVE LINE (H330P) BEGINNING AT 108 SEC WHEN H330P DATA BEGAN TO DROP FROM 3078 PSIA TO 1800 PSIA.</p> <p>CORRECTIVE ACTION-UNDER INVESTIGATION AT THIS TIME.</p>							
PROPULSION-NA3-A/B BOOSTER	99A110M FUEL STRUT NOSE	UTP-PRT 99-00009-3	851018	FACTORY	YES NO	FLEX METAL NOS C 10016-3	
<p>FAILURE MODE-OUT OF TOLERANCE. DURING THE PRT FUELING TEST THE FORCE REQUIRED TO DEPLOY THE NOSE PREPROGRAMMED TO 61.5 PSIG EXCEEDED THE ALLOWABLE 480 POUNDS. ACTUAL VALUES 400 TO 800 POUNDS.</p>							

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SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PHI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-WAS-A/B BOOSTER	60C/22M83-022-0A1053-7LA-7HO-01-71 12 BOOSTER LOZ LIQUID REGULATOR	60C/22M83-022-0A1053-7LA-7HO-01-71 600006	7112	2-4/PALC	YES NO	
CORRECTIVE ACTION-REPLAY THE TEST WITH A REDESIGNED FORCE MEASURING FIXTURE THAT WILL NOT PRODUCE A TORQUE RESTRAINT ABOUT THE UNIT CENTERLINE OF THE FREE END IN ANY OF THE REQUIRED 8 POSITIONS. DESIGN WILL REVISE BOOR SPECIFICATION W 99-02208 TO CLARIFY THE REQUIREMENTS AS DESCRIBED ABOVE.						
FAILURE MODE-LEAK-EXTERNAL. AT FULL SYSTEM PRESSURE A MINOR LEAK WAS DETECTED DURING POST TEST INVESTIGATION AT THE INLET TO THE BOOSTER LOZ LIQUID REGULATOR.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE LEAK WAS REPAIRED.						
PROPULSION-WAS-A/B BOOSTER	60C/22M83-013-7L3-702-00-7104 806 LOZ REFERENCE REGULATOR	FLIGHT	7103 800312	2-5/PALC 79	YES NO	
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME- STICKING TEST PORT CHECK VALVE						
SYSTEM EFFECT-NONE. REGULATOR PRESSURE DROPPED ABRUPTLY 10 PSI RATHER THAN GRADUALLY DECREASING DUE TO ATMOSPHERIC PRESSURE DECREASE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE, THIS ANOMALY IS NOT CONSIDERED TO BE A PROBLEM BY EITHER ROCKETDYNE OR GD/C.						
PROPULSION-WAS-A/B BOOSTER	60C/22M83-008-0A1040-7L3-7HO-03-71 04 8-HUT, 01 IGNITER FUEL VALVE	27-02171-008	7104 850304	2-3/PALC	YES NO	
FAILURE MODE-LEAK-EXTERNAL. LEAKS WERE FOUND AT THE 01 IGNITER FUEL VALVE DURING THE FUEL LEAK CHECK.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-TIGHTENED 8-HUT.						
PROPULSION-WAS-A/B BOOSTER	60C/22M83-004-7L3-701-00-7104	FLIGHT	7106 850183	2-3 D	YES NO	
FAILURE MODE-EXTERNAL LEAK. LOSS OF CONTROLS SYSTEM HELIUM AS A RESULT OF LEAKAGE AT UNKNOWN POINT. POSSIBLE LEAK P ORTS CONSIDERED ARE 1) BOOSTER CONTROL REGULATOR MANUAL BLEED VALVE 2) PRESSURE LINES TO 01 AND 02 MAIN LOZ AND FUE L VALVES, BOOSTER GAS GENERATOR, AND BOOSTER LOZ REFERENCE REGULATOR.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRE OTH	VENDOR NAME VENDOR PART NO	
	SYSTEM EFFECT-NONE. ALTHOUGH CONTROL PRESSURE DECAY RATE WAS EXCESSIVE DURING BOOSTER PHASE THERE WAS ADEQUATE PRESSURE TO MAINTAIN PREBURST PRESSURIZATION FUNCTIONS.						090299
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-NONE. EXISTING PNEUMATIC AND PROPULSION SYSTEM LEAK CHECKS CONSIDERED ADEQUATE. A STEP TO VERIFY THAT 1 LB BURST PRESSURE WAS NOT EXCEEDED WAS ADDED TO THE PRE-COUNT PROCEDURES.						
PROPULSION-MAS-A/S BOOSTER	09A3902-1 FUEL START MISC. 4997.	UTP-GUAL/PPY 09-02203-1	090122	FACTORY	YES NO	FLEX METAL NOS E 10245-16	090299
	FAILURE MODE-OUT OF SPECIFICATION. DURING THE INITIAL FLEX FORCE TEST THE FORCE REQUIRED TO DEFLECT THE NOSE PRESSURE WAS 850 PSIG EXCEEDED THE 80 POUNDS ALLOWABLE. THE ACTUAL FORCES WERE 110 TO 511 POUNDS.						090299
	CORRECTIVE ACTION-NONE. THE ACTUAL LOADS MEASURED WERE RE-EVALUATED BY ROCKETDYNE AND CONCLUDED TO THE SHEAR LOAD A 50 LB. AXIAL LOAD 203 LB. MOMENT 1500 IN. LB. OLD VALUES WERE LINEAR LOAD 50 LB. MOMENT 2900 IN. LB. ALSO TO THE NEW NOSE DESIGNATION OF 09-02203-3.						
PROPULSION-MAS-A/S BOOSTER	09A3902 FUEL START MISC. 4997.	UTP-GUAL/PPY 09-02203-1	090104	FACTORY	YES NO	FLEX METAL NOS E 10245-16	090299
	FAILURE MODE-OUT OF SPECIFICATION. DURING THE BURST TEST THE UNIT REPTURED AT 1500 PSIG. REG. IS 1965 PSIG. MIN.						
	SYSTEM EFFECT-NONE. NOSE BURST ABOVE OPERATING PRESSURE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-ALL NOSES MANUFACTURED IDENTICALLY TO THE FAILED UNIT TO BE RETURNED TO THE VENDOR AND REMARKED USING A STRONGER MATERIAL.						
PROPULSION-MAS-A/S BOOSTER	09A3902 FUEL START MISC. 4997.	UTP-GUAL/PPY 09-02203-1	041203	FACTORY	YES NO	FLEX METAL NOS E 10245-16	090299
	FAILURE MODE-OUT OF SPECIFICATION. DURING THE INITIAL FLEX FORCE TEST. THE FORCE REQUIRED TO DEFLECT THE NOSE PRESSURE WAS 850 PSIG EXCEEDED THE 80 POUNDS ALLOWABLE. THE ACTUAL FORCES WERE 100 TO 229 POUNDS.						
	CORRECTIVE ACTION-NONE. THE ACTUAL LOADS MEASURED WERE RE-EVALUATED BY ROCKETDYNE AND FOUND TO BE ACCEPTABLE. SPECIFICATION 09-02203 WILL BE REVISED TO REFLECT THE HIGHER ALLOWABLE LOADS.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MAS-A/B BOOSTER	90C/22M64-048-041034-LA-7HO-02-71 000 FLEW NONE, B-HUT	COMPOSITE-PRD/DPL	7109 041187	2-4/PALC	YES NO		000776
FAILURE MODE-LEAK-EXTERNAL. SMALL LEAK WAS FOUND AT THE FLEX NONE CONNECTION TO THE BOOSTER 1 IGNITION FUEL VALVE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE B-HUT WAS RETURNED.							
PROPULSION-MAS-A/B BOOSTER	A3-4HO-01-247 B1 FUEL PUMP OUTLET FLANGE, SEAL	COUNTDOWN	2470 040919	A3/ATR	YES NO	YES ROCKETDYNE	000842
FAILURE MODE-LEAK. EXTERNAL. LEAKAGE WAS NOTED AT THE B1 FUEL PUMP OUTLET FLANGE DURING A LEAK CHECK.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED.							
CORRECTIVE ACTION-B1 FUEL PUMP OUTLET FLANGE SEALS WERE FOUND FAULTY AND REPLACED.							
PROPULSION-MAS-A/B BOOSTER	GOA/BRE84-010/LB-401-00-296 LOX REGULATOR	FLIGHT	2960 040311	2-3/PALC	YES NO	YES ROCKETDYNE	000842
FAILURE MODE-OUT OF EXPECTED VALUE. THE USUAL TRANSIENT IN BOOSTER LOX REGULATOR REFERENCE PRESSURE DATA DID NOT OCCUR WHEN THE ENGINE TANKS WERE PRESSURIZED. NO EXPLANATION IS AVAILABLE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NO CORRECTIVE ACTION TAKEN.							
PROPULSION-MAS-A/B BOOSTER	GOA83-1237/P4-LO-01-042 VENT PORT CHECK VALVE-LOX REFERENCE E REGULATOR	FLIGHT	1230 0311	344/ETR	YES NO	YES ROCKETDYNE	000439
FAILURE MODE-OUT OF EXPECTED TEST VALUE. STICKING VENT PORT CHECK VALVE ON THE REGULATOR RESULTED IN A 10 PSI DECREASE IN BOOSTER LOX REFERENCE REGULATOR PERFORMANCE.							
SYSTEM EFFECT-OPERATION TOO LOW-BOOSTER ENGINE PERFORMANCE DROPPED APPROXIMATELY 1 PERCENT AT 87 SECONDS.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							

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CONTRACT DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PRI OTM	VEHICLE NAME VEHICLE PART NO
PROPULSION-HAS-A/B BOOSTER	60/103-1227/00A-10-01-0408 THRUST CHAMBER	COUNTDOWN	1200 031127	304/ETR -19540	NO NO	001100
FAILURE MODE-OUT OF EXPECTED VALUE. BOOSTER ENGINES INERT FLUID FILL WAS NOT COMPLETED BY PRESCRIBED TIME. NO DUAL NO PROBLEM.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-COUNTDOWN DELAYED. 10 MINUTE HOLD.						
CORRECTIVE ACTION-HOLD TO COMPLETE BOOSTER ENGINES INERT FLUID FILL AND CLEAR THRUST SECTION.						
PROPULSION-HAS-A/B BOOSTER	ADJCS-0031/11-421-00-100	FLIGHT	1000 030027	304/ETR -19540	YES NO	000432
FAILURE MODE-AN OPEN CIRCUIT EXISTED IN THE BOOSTER IGNITION DETECTION SYSTEM RESULTING IN ENGINE SYSTEM SHUTDOWN WHEN THE IGNITION STAGE SURGEY WAS NOT COMPLETED.						
SYSTEM EFFECT-OPERATION STOPS PREMATURELY.						
VEHICLE EFFECT-PROXIMATE PROPULSION SYSTEM CUTOFF.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-HAS-A/B BOOSTER	AA02-0002/PB-400H-07-104/C-1 BE FUEL OUTLET DUCT	COMPOSITE-PRO/DPL	1000 011222	304/ETR -19540	YES NO	000704
FAILURE MODE-LEAK-EXTERNAL. A SMALL LEAK WAS DISCOVERED IN THE BE FUEL OUTLET DUCT AFTER TANKING.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-REPAIR.						
PROPULSION-HAS-A/B BOOSTER	ETR-019/10-514-A2-02 POCKET-GAS GENERATOR LON B1	CAPTIVE	1-02 000002	1-4/EDNA NO	YES NO	000030
FAILURE MODE-INTERNAL LEAK. HOT GAS FROM SPIN CHARGE LEAKED PAST POPPET AT ENGINE START.						
SYSTEM EFFECT-OPERATION TOO HIGH. ABNORMAL 66 INJECTION PRESSURE RISE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-THE GAS GENERATOR WAS REMOVED AND RETURNED TO THE VENDOR FOR REPAIR AND RE-ACCEPTANCE TESTING PRIOR TO RE-INSTALLATION.						
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DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPUSSION-WAS-A/B BOOSTER	ETR-019/14-318-A2-BE LUBE OIL MANIPOLD & NUT	CAPTIVE	600602	1-4/EDMA R08	YES NO	094190
FAILURE MODE-LEAK-POST TEST INSPECTION REVEALED A SMALL LEAK AT A B NUT IN THE SENSITIVE LINE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPUSSION-WAS-A/B BOOSTER	ETR-019/14-318-A2-BE GAS GENERATOR-ORIFICE	CAPTIVE	600602	1-4/EDMA R08	YES NO	094197
FAILURE MODE-OUT OF TOLERANCE-B1 GAS GENERATOR WAS IMPROPERLY ORIFICED.						
SYSTEM EFFECT-OPERATION TOO LOW-B1 ENGINE PERFORMANCE WAS 8 PCT LOW.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN. GAS GENERATOR WILL BE RE-ORIFICED.						
PROPUSSION-WAS-A/B BOOSTER	ETR-017/14-318-1L-BE GAS GENERATOR LOX CHECK VALVE	CAPTIVE	600615	1-4/EDMA R08 T PLUS 0 .34	YES NO	094195
FAILURE MODE-PREATURE OPERATION-LOX CHECK VALVE CRACKED PREMATURELY.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPUSSION-WAS-A/B BOOSTER	ETR-016/14-311-1L-BE BE GAS GENERATOR LOX CHECK VALVE	CAPTIVE	600603	1-4/EDMA R08 T PLUS 0 .585	YES NO	094201
FAILURE MODE-PREATURE OPERATION-LOX CHECK VALVE CRACKED PREMATURELY.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-A1800NE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PR1 OTM	VENDOR NAME VENDOR PART NO
PROPULSION-MAS-A/B BOOSTER	ETR-018/14-511-1K-DE 51 GAS GENERATOR LOX CHECK VALVE	CAPTIVE	800803	1-4/EDNA RDS T PLUS 0 .899	YES NO	ROCKETDYNE
FAILURE MODE-PREATURE OPERATION-LOX CHECK VALVE CRACKED PREMATURELY.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MAS-A/B BOOSTER	ETR-018/14-511-1K-DE TURBOPUMP ACCESSORY DRIVE SHAFT-DE AL	CAPTIVE	800803	1-4/EDNA RDS	YES NO	ROCKETDYNE
FAILURE MODE-LEAK-LEAK WAS DISCOVERED AT SEAL DURING POST TEST INSPECTION.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MAS-A/B BOOSTER	ETR-013/14-507-1H-DE BOOSTER GAS GENERATOR ORIFICE	CAPTIVE	800506	1-4/EDNA RDS	YES NO	ROCKETDYNE
FAILURE MODE-OUT OF TOLERANCE-FUEL SIDE OF BOTH BOOSTER GAS GENERATORS WERE IMPROPERLY ORIFICED.						
SYSTEM EFFECT-OPERATION TOO HIGH-GAS GENERATOR OPERATED LOX RICH, RESULTING IN HIGH COMBUSTION TEMPERATURE.						
VEHICLE EFFECT-PREATURE PROPULSION CUTOFF- THE TEST WAS PREMATURELY TERMINATED BY AN OBSERVER WHEN THE 6.6. COMBUS TION TEMPERATURE EXCEEDED REDLINE AT T PLUS 21.56 SECS.						
CORRECTIVE ACTION-UNKNOWN.						
PROPULSION-MAS-A/B SUBSTAINER	LA-7ND-01-7117 REGULATOR-GAS	COMPOSITE-PRD/DPL	7117 800408	PALCE-4	YES NO	MAA
FAILURE MODE-SUBSTAINER LOX REGULATOR REFERENCE PRESSURE EXHIBITED 12 PSI STEPS.						
SYSTEM EFFECT-ERRATIC OPERATION.						
VEHICLE EFFECT-TEST MISCHEDULE.						
CORRECTIVE ACTION- THE REGULATOR WAS REPLACED.						

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF TIME	SITE DIF TIME	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MAS-A/B SUSTAINER	PR-702-00-0001 VALVE-CHECK	COUNTDOWN	5001 040330	ETR-12 -1	YES NO	090370
FAILURE MODE-SUSTAINER ENGINE FAILED TO BOOTSTRAP BECAUSE THE SUSTAINER LOX BOOTSTRAP CHECK VALVE WAS INSTALLED SAC AMBROS.						
SYSTEM EFFECT-OPERATION DOES NOT START THE SUSTAINER ENGINE FAILED TO START.						
VEHICLE EFFECT-THE LAUNCH WAS ABORTED.						
CORRECTIVE ACTION-CHECKOUT PROCEDURES WERE REVISED TO PROVIDE MORE COMPLETE CHECKS OF CHECKVALVE INSTALLATIONS.						
PROPULSION-MAS-A/B SUSTAINER	574-3-00-34 VALVE-PROPELLANT	FLIGHT	304D 040319	ABREDA-1 NO	YES NO	090408
FAILURE MODE-THE H8 VALVE MOVEMENT WAS BLURRY AND FAILED TO CLOSE AT SECO. FREEZING OF THE CLOSING HYDRAULIC CONTR OL LINE IS SUSPECT.						
SYSTEM EFFECT-OPERATION TOO LONG RESIDUAL THRUST EXISTED FOR APPROXIMATELY 30 SECONDS.						
VEHICLE EFFECT-RV WAS BUMPED EIGHT TIMES AND RV OVERSHOOT WAS APPROXIMATELY 70 MILES.						
CORRECTIVE ACTION-MAS IS MAKING A STUDY OF THE LOX DOME AREA SEALS. IT HAS BEEN RECOMMENDED THAT CRITICAL LINES BE INSULATED PER ROCKETDOME APIN 98 AS DONE ON BLV VEHICLES.						
PROPULSION-MAS-A/B SUSTAINER	574-3-00-34	FLIGHT	304D 040319	ABREDA-1 NO	YES NO	090408
FAILURE MODE-A SUSTAINER LOX LEAK WAS EVIDENCED BY FREEZING OF THE H8 VALVE HYDRAULIC CLOSING CONTROL LINE.						
SYSTEM EFFECT-OPERATION TOO LONG. H8 VALVE DID NOT CLOSE AT SECO RESULTING IN APPROXIMATELY 30 SECONDS RESIDUAL THR UST.						
VEHICLE EFFECT-RV WAS BUMPED EIGHT TIMES AND RV OVERSHOOT WAS APPROXIMATELY 70 MILES.						
CORRECTIVE ACTION-MAS IS MAKING A STUDY OF THE LOX DOME AREA SEALS.						
PROPULSION-MAS-A/B SUSTAINER	574-3-00-10	FLIGHT	7116 040316	PALCE-4 NO	YES NO	090408
FAILURE MODE-PROPELLANT RESIDUAL WAS 954 POUNDS LESS THAN EXPECTED AT SECO LEADING TO THE HYPOTHESIS THAT SUSTAINER ENGINE PERFORMANCE WAS ABNORMAL.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						

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SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE OF	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-INVESTIGATION OF SUSTAINER ENGINE PERFORMANCE IS IN PROGRESS.							890410
PROPULSION-MAS-A/B SUSTAINER	P4-TBN-05-5308 PUMP-TURBO	COMPOSITE-PRO/DPL	5302	ETN14	YES	NAA	890379
FAILURE MODE-DURING POST DPL INSPECTION EVIDENCE WAS FOUND OF A LOX LEAK PAST THE SUSTAINER PUMP CAVITY SEAL. SYSTEM EFFECT-LOW THERMAL ENVIRONMENT. VEHICLE EFFECT-TEST RESCHEDULED.							
CORRECTIVE ACTION-THE PUMP WAS REMOVED- SEAL REPLACED AND PUMP REINSTALLED.							
PROPULSION-MAS-A/B SUSTAINER	60C/BNP80-007 FITTING	FLIGHT	7119	PALC2-4	YES	NAA	890422
FAILURE MODE-EXTERNAL LEAK. A SUSTAINER LOX LEAK WAS EVIDENCED BY FREEZING OF MEASUREMENT P330P SENSE LINE. SYSTEM EFFECT-LOW TEMPERATURE ENVIRONMENT. VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-OPEN-NAA IS ATTEMPTING TO ISOLATE POSSIBLE SUSTAINER THRUST CHAMBER LOW DOME ELBOW LEAKAGE AREAS.							
PROPULSION-MAS-A/B SUSTAINER	50/CZDMS-031-0A1082- 13 HEAD SUPPRESSION VALVE	FLIGHT	7119	8-4/PALC	YES	ROCKETDYNE	890761
FAILURE MODE-EXTERNAL LEAK. POST DPL INSPECTION INDICATED H.S. VALVE GATE TAKAGE. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-VALVE WAS REPLACED.							
PROPULSION-MAS-A/B SUSTAINER	60C/BNP89-088/P4-701-00-8901	FLIGHT	5301	14/ETR	YES		
FAILURE MODE-OUT OF EXPECTED TEST VALUE-LOX LEAK IN THRUST SECTION INDICATED BY PRESSURE DROP ON P330P (SUSTAINER PU CL PUMP DISCHARGE PRESSURE) FROM 36 TO 70 SECONDS INDICATIVE OF A FROZEN SENSE LINE. POST ENGINE COMPARTMENT AMBIEN T 6A) SUBSTANTIATES LOX LEAK. PRIMARY SUSPECT AREAS ARE, 1) SUSTAINER LOX DOME, 2) SUSTAINER LOX FOOTSTRAP CHECK VAL VE AREA, AND 3) HEAD SUPPRESSION VALVE AREA. SYSTEM EFFECT-NONE. LEAK OF SUCH A SMALL MAGNITUDE THAT PROPULSION SYSTEM OPERATION WAS NOT AFFECTED.							

18 JUN 1988

GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PR OTH	VENDOR NAME VENDOR PART NO	
VEHICLE EFFECT-NONE.							0899017
CORRECTIVE ACTION-NONE AT THIS TIME. UNDER INVESTIGATION.							
PROPULSION-MAS-A/S SUSTAINER	60/CA4483-001-40/PC-CO-02-0071-014 PROPELLANT UTILIZATION VALVE	FACTORY 690722	7114	FACTORY	NO		0899082
FAILURE MODE-OUT OF TOLERANCE- PROPELLANT UTILIZATION VALVE SERVO VOLTAGE FOR STATION 4 WAS RECORDED FROM DIGITAL V OLTMETER AS 3.378 VOLTS WHEN 3.7 VOLTS WAS EXPECTED (3.439 VOLTS MINIMUM ALLOWED). TELEMETRY DATA (U131V SERVO FEEDB ACK) DISPLAYED AN ACCEPTABLE 3.88 VOLTS.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE. DISCREPANCY COULD NOT BE DUPLICATED. HOWEVER DISCREPANCY WAS ATTRIBUTED TO INCOMPLETE VOLTA GE SAMPLING BY THE TEST EQUIPMENT DIGITAL VOLTMETER.							
PROPULSION-MAS-A/S SUSTAINER	08A4315-1 LOK START TANK NOSE ASSY.	UTP-PAT 06-02201-1	050423	FACTORY	YES FLEXIBLE METAL NO MOSE 10101-1		0800012
FAILURE MODE-OUT OF TOLERANCE. DURING INITIAL ACCEPTANCE TEST THE DISPLACEMENT FORCE EXCEEDED THE 50 LB MAX. ACTUAL FORCES WERE 50.4 TO 87.1 LBS.							
CORRECTIVE ACTION-NONE. THE EXTREME OUT OF TOLERANCE FORCES MEASURED WERE IN PART DUE TO THE TEST FIXTURE WHICH DID NOT ALLOW ROTATION OF THE NOSE END. REDESIGN THE TEST FIXTURE AND REPEAT THE I.A.T. FLEXING TEST.							
PROPULSION-MAS-A/S SUSTAINER	08A4315-1 LOK START TANK NOSE ASSY	UTP-PAT 06-02201-1	050409	FACTORY	YES FLEXIBLE METAL NO MOSE 10101-1		0800331
FAILURE MODE-OUT OF TOLERANCE. DURING INITIAL EXAMINATION OF PRODUCT IT WAS FOUND THAT THE RADIOUS OF THE FLEXIBLE SECTION OF THE UNIT WAS APPROXIMATELY 30 INCHES. REQ. IS 7.9 INCHES. REF. TANK HISTORY LOG NO. 931-1-009. S/W 002.							
CORRECTIVE ACTION-NONE. THE TYPE OF BELLOW AND BRAID USED IN THE FLEXIBLE SECTION IS DIFFICULT TO PREFORM. THEREFO RE THE OUT OF TOLERANCE CONDITION WOULD NEED NO CORRECTIVE ACTION PROVIDED THE UNIT PASSES THE REMAINDER OF THE TEST							

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**GENERAL DYNAMICS  
CONVAIR DIVISION**

# DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	BITE TIME DIF	PRI OTM YES NO	VENDOR NAME VENDOR PART NO
PROPULSION-MAS-A/B SUSTAINER	BKF03-QDQ/A01-001-00-097 SENSE LINE	FLIGHT	2970 030386	A-1/MTR YES 36 NO	YES NO	
FAILURE MODE-LEAK-EXTERNAL. LOX IMPIING ON THE SUSTAINER FUEL PUMP DISCHARGE PRESSURE TRANSDUCER SENSE LINE CAUSE TEMPORARY FREEZING OF THE FUEL IN THE LINE. EXACT SOURCE OF LEAK IS UNKNOWN. SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY. LEAK WAS OF SUCH A SMALL MAGNITUDE THAT ENGINE PERFORMANCE WAS NOT AFFECTED.						
<b>VEHICLE EFFECT-NONE.</b> <b>CORRECTIVE ACTION-NO CORRECTIVE ACTION IS PLANNED CONCERNING INSTRUMENTATION SENSE LINE FREEZING HOWEVER, REROUTING OR WRAPPING OF CRITICAL CONTROL LINES, AND OTHER LINES NECESSARY TO VEHICLE OPERATION, IS BEING DONE ON A SELECTIVE BASIS ALONG WITH Ongoing ENGINE BOLTS.</b>						
PROPULSION-MAS-A/B SUSTAINER	GDC-BMF03-009/A1-001-00-211 SENSE LINE	FLIGHT	2110 030227	A-1/MTR YES 48 NO	YES NO	
FAILURE MODE-LEAK-INTERNAL. LOX IMPINGING ON THE SUSTAINER FUEL PUMP DISCHARGE PRESSURE TRANSDUCER SENSE LINE CAUSE TEMPORARY FREEZING OF THE FUEL IN THE LINE. EXACT SOURCE OF LEAK IS UNKNOWN. SYSTEM EFFECT-NONE. LEAK WAS OF SUCH SMALL MAGNITUDE THAT ENGINE PERFORMANCE WAS NOT AFFECTED.						
<b>VEHICLE EFFECT-NONE.</b> SUSTAINER FUEL PUMP DISCHARGE PRESSURE INSTRUMENTATION SENSE LINE PROBE AS A RESULT OF THE LOW LEAK.						
<b>CORRECTIVE ACTION-NO CORRECTIVE ACTION IS PLANNED CONCERNING INSTRUMENTATION SENSE LINE FREEZING. HOWEVER, REROUTING &amp; OR WRAPPING OF CRITICAL CONTROL LINES, AND OTHER LINES NECESSARY TO VEHICLE OPERATION IS BEING DONE.</b>						
PROPULSION-MAS-A/B SUSTAINER	F7AB324/PB-WD-01-0AC3 TURBOPUMP SEAL	COMPOSITE-FRD/OPL	1960 030211	3BA/EIR YES NO	YES 451807-71 NO	
FAILURE MODE-LEAK-INTERNAL. SUSTAINER TURBOPUMP SHAFT SEAL LEAKED INTO PUMP BEARING CAVITY AND THEN INTO SUSTAINER LUKE OIL MANIFOLD. SYSTEM EFFECT-CONTAMINATION. <b>VEHICLE EFFECT-NONE.</b>						
<b>CORRECTIVE ACTION-CLOSED BOOSTER AND SUSTAINER PREVALVES AND DRAINED THE ENGINE SYSTEM IN ORDER TO CONTINUE TEST. LATER INVESTIGATIONS DETERMINED FUEL LEAKAGE RATE WITHIN SPECIFICATIONS.</b>						
PROPULSION-MAS-A/B SUSTAINER	F7AD581/P4-TWO-01-5301 SUSTAINER TURBO PUMP SHAFT SEAL	COMPOSITE-FRD/OPL	3301 030208	1A/EIR YES NO	YES ROCKETDYNE NO	
FAILURE MODE-INTERNAL LEAK. OBSERVED FUEL LEAKAGE FROM SUSTAINER TURBOPUMP SHAFT SEAL INTO NUMBER 2 BEARING CAVITY AND LUKE OIL DRAIN MANIFOLD. SYSTEM EFFECT-CONTAMINATION. FUEL CONTAMINATION IN BEARING CAVITY AND LUKE OIL DRAIN MANIFOLD <b>VEHICLE EFFECT-NONE.</b>						

GENERAL DYNAMICS  
CONVAIR DIVISION

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PHI OTH	VEHICLE NAME VEHICLE PART NO
	CORRECTIVE ACTION-LEAK WAS AGAIN OBSERVED DURING TEST PA-79H-02-9301 ON 10 FEBRUARY 69 AND ENGINE SUBSEQUENTLY REPLACED.					
PROPULSION-WAS-A/B SUSTAINER	AA65-0003/PA-79D-01-9301 SUSTAINER FUEL PUMP SHAFT SEAL.	COMPOSITE-79D/DPL	9301	14/ETR	YES	ROCKETDYNE NO TLR105-WA-7
	FAILURE MODE-LEAK EXTERNAL. FUEL LEAKAGE WAS DISCOVERED TO BE COMING FROM THE BEARING NO.2 DRAIN LINE INDICATING LEAKAGE PAST THE FUEL PUMP SHAFT SEAL.					
	SYSTEM EFFECT-CONTAMINATION. HEAVY FUEL LEAKAGE NOTED AT SEQUENCE III PRESSURE.					
	VEHICLE EFFECT-NONE. TEST WAS COMPLETED PRIOR TO DISCOVERY OF THIS CONDITION.					
	CORRECTIVE ACTION-SUSTAINER ENGINE WAS REMOVED AND REPLACED.					
PROPULSION-WAS-A/B SUSTAINER	FTAB517/PA-79D-01-9301 MICROMETER - SUSTAINER ENGINE PU VALVE OPEN	COMPOSITE-B FACT	9301	14/ETR	YES	250420 NO
	FAILURE MODE-FAILED TO OPERATE AT PRESCRIBED TIME. PU VALVE MICROMETER FAILED TO ACTIVATE DURING ENGINE SEQUENCE U SINCE 2000 PSI HYDRAULIC PRESSURE.					
	SYSTEM EFFECT-OPERATION STOPS PREMATURELY - MAINSTAGE LIMITER TIMER CUTOFF DUE TO MAIN ENGINE COMPLETE NOT BEING OBTAINED.					
	VEHICLE EFFECT-COMPOSITE DELAYED.					
	CORRECTIVE ACTION-MICROMETER READJUSTED TO ACTIVATE WITH THE VALVE OPEN USING 2000 PSI HYDRAULIC PRESSURE.					
PROPULSION-WAS-A/B SUSTAINER	FTAB466/PA-4CO-02-299 SIGNAL BLOCK	COMPOSITE-J FACT	2990	19/ETR	YES	ROCKETDYNE NO
	FAILURE MODE-ERRATIC OPERATION TELEMETRY DATA INDICATED SUSTAINER CROSS COUPLING WHEN THE SUSTAINER ENGINE WENT TO THE STOPS IN NEGATIVE PITCH AND POSITIVE YAW AT THE SAME TIME.					
	SYSTEM EFFECT-NONE.					
	VEHICLE EFFECT-NONE.					
	CORRECTIVE ACTION-UNKNOWN. INVESTIGATION INDICATED PROBABLE CAUSE WAS SIGNAL BLOCK STOP.					
PROPULSION-WAS-A/B SUSTAINER	60A-AP264-003/11-401-00-249 HEAD SUPPRESSION SERVO CONTROL VALVE	FLIGHT	2480	A-1/ETR	YES	
	FAILURE MODE-ERRATIC OPERATION. LOW HEAD SUPPRESSION VALVE BEGAN TO CLOSE BETWEEN 201 SECONDS AND 202.0. A FOUR-DEGREE CHANGE IN VALVE POSITION WAS NOTED AT 202.0.					

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GENERAL DYNAMICS  
CONVAIR DIVISION

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SIZE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
							001800
	SYSTEM EFFECT-OPERATION TOO LOW. CLOSURE OF THE LOW HEAD SUPPRESSION VALVE CAUSED A DETERIORATION IN SUSTAINER ENGINE PERFORMANCE BETWEEN 800 SECONDS AND 8600.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-NONE						
							004800
PROPULSION-WAS-A/B SUSTAINER	LV-88-80-3010-P VALVE-P/V	PAR 87-43010-21	2500 040723	CTR	YES NO		
	FAILURE MODE-OUT OF TOLERANCE-DURING P/U SYSTEM CHECKOUT, THE NOMINAL VALVE ANGLE WAS OUT OF TOLERANCE AND VALVE POSITION VOLTAGE WAS 0.05 VOLT HIGH. FAILURE OF VALVE TO RETURN TO THE CORRECT NOMINAL ANGLE CAN BE CAUSED BY AN IMPROPER SIGNAL VOLTAGE FROM COMPUTER COMPARTMENT OR BY FRICTION IN THE VALVE. TROUBLE REPORTED WAS CAUSED BY A STICKING VALVE. THIS CONDITION APPARENTLY CORRECTED ITSELF AS NO ADDITIONAL VALVE TROUBLE WAS OBSERVED.						
	CORRECTIVE ACTION-TAKE NECESSARY ACTION TO HAVE CLARIFYING STATEMENTS ADDED TO EXISTING PROCEDURES TO ELIMINATE REJECTIONS OF P/U MATCHED SETS WHEN FAILURES ARE CAUSED BY STICKING VALVES IN THE ENGINE.						
							006487
PROPULSION-WAS-A/B SUSTAINER	60A/AP2M-033/A1-401-00-843 LUBE OIL MANIFOLD	FLIGHT	2430 040810	A-1/NTR ENG	YES NO		
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. THE SUSTAINER LOW PRESSURE LUBE OIL MANIFOLD PRESSURE DECREASED ONLY 15 PSI DURING THE COURSE OF SUSTAINER ENGINE OPERATION. NORMALLY, A DECREASE OF APPROXIMATELY 30 TO 35 PSI IS EVIDENCED DURING SUSTAINER ENGINE OPERATION.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-NONE.						
							008000
PROPULSION-WAS-A/B SUSTAINER	60A/BKPM-010/L3-401-00-331 SUSTAINER ENGINE-GAS GENERATOR	FLIGHT	3310 040423	E-3/PALC 0	YES NO		
	FAILURE MODE-OUT OF EXPECTED TEST VALUE. SUSTAINER ENGINE THRUST CHAMBER PRESSURE, FUEL PUMP DISCHARGE PRESSURE, LOW INJECTION MANIFOLD PRESSURE AND GAS GENERATOR DISCHARGE PRESSURE ALL INDICATED LOW ENGINE PERFORMANCE.						
	SYSTEM EFFECT-OPERATION TOO LOW. SUSTAINER ENGINE PERFORMANCE AT LIFTOFF WAS LOW AND DECREASED MORE THAN EXPECTED DURING FLIGHT.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-NONE. DIFFICULTY WAS DETERMINED TO BE AN ISOLATED INCIDENT AND SPECIFIC CAUSE WAS NOT DETERMINED. NO FURTHER ACTION TAKEN.						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-WAS-A/B SUBTAINER	60/ABRP64-006/L3-402-00-208	FLIGHT	2030 040228	2-3 50	YES NO	
<p>FAILURE MODE-EXTERNAL LEAK, LOW LEAK PROBABLY IN HIGH PRESSURE FEED SYSTEM BETWEEN LOX PUMP AND INJECTOR. EVIDENCED BY LOW THRUST SECTION TEMPERATURES AND FROZEN SUBTAINER FUEL PUMP INSTRUMENTATION DISCHARGE TRANSDUCER SENSE LINE.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-NONE.</p>						
PROPULSION-WAS-A/B SUBTAINER	FTAB349/P2-4CO-03-199 TUBING B-NUT	COMPOSITE-J FACT	1990 040113	12/ETR	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-LEAK-EXTERNAL. HYDRAULIC FLUID LEAKAGE AT A B-NUT ON THE SUBTAINER GAS GENERATOR PROPELLANT VALVES CLOSING LINE.</p> <p>SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY.</p> <p>VEHICLE EFFECT-COMPOSITE DELAYED.</p> <p>CORRECTIVE ACTION-TIGHTENED B-NUT. FURTHER CORRECTING ACTION IS UNKNOWN.</p>						
PROPULSION-WAS-A/B SUBTAINER	FTAB349/P2-4CO-03-199 VALVE-CHECK-866 BOOTSTRAP	COMPOSITE-J FACT	1990 040113	12/ETR 285	YES NO	YES ROCKETDYNE
<p>FAILURE MODE-OUT OF EXPECTED VALUE. THE ORIFICED 866 BOOTSTRAP CHECK VALVE WAS BEING HELD OPEN WITH CONTAMINATION. SOME PIECE OF ETHYL CELLULOSE).</p> <p>SYSTEM EFFECT-OPERATION TOO HIGH. OPEN CHECK VALVE RESULTED IN AN ABNORMAL FUEL DUCT PRESSURE RISE BETWEEN BECO AND VECO BECAUSE OF BACK-UP OF VERNIER FUEL PURGE PRESSURE PAST THE CHECK VALVE.</p> <p>VEHICLE EFFECT-COMPOSITE DELAYED.</p> <p>CORRECTIVE ACTION-CHECK VALVE WAS REMOVED, CLEANED AND REINSTALLED. ALL OTHER TRAPS FOR CONTAMINATION IN THE SUBROU NOISE AREA WERE CHECKED AND NO FURTHER CONTAMINATION WAS FOUND.</p>						
PROPULSION-WAS-A/B SUBTAINER	A463-0037/P2-4CO-01-203 SWITCH-PROPELLANT DEPLETION	COMPOSITE-B FACT	2030 030910	12/ETR PLUS 223	NO NO	
<p>FAILURE MODE-PREATURE OPERATING. PNEUMATIC PRESSURE TO THE PROPELLANT DEPLETION SWITCHES WAS INADVERTENTLY LIMITED, AS THE PROGRAMMER ENABLED HIS VECO CIRCUITRY. THE SUBTAINER ENGINE WAS CUTOFF.</p> <p>SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS.</p>						

GENERAL DYNAMIC  
CONVIAIR DIVISION

# DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	BITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO
<b>VEHICLE EFFECT-PREREATURE SUSTAINER CUTOFF.</b>						
CORRECTIVE ACTION-TEST PROCEDURE WAS CHANGED TO INSURE PNEUMATIC PRESSURE WOULD BE APPLIED TO THE SWITCHES.						
PROPULSION-WAS-A/B SUSTAINER	USE-36/AI-403-00-108 VALVE-PROPELLANT	FLIGHT	1920 830813	A-1/MTR O.	YES YES	
FAILURE MODE-DRIPT. POSSIBILITY THAT THE PU VALVE DRIFTED FROM ITS FIRED POSITION DUE TO BACKING OFF OF THE LOCK NUT WHICH HOLDS THE SET NUT. PROPELLANT CONSUMPTION NOT AS PREDICTED. SIMILAR ERRORS ON FOUR PREVIOUS FLIGHTS. OTHER P						
USABILITY IS THAT PREDICTION WAS IN ERROR.						
SYSTEM EFFECT-OPERATION TOO HIGH. WITH A FIRED PU VALVE ANGLE OF 38.1 DEGREES, PREDICTED RESIDUAL WAS 300 POUNDS OF FUEL AT THEORETICAL LOW DEPLETION. FLIGHT DATA INDICATED A RESIDUAL OF 1920 POUNDS OF LOX AT THEORETICAL FUEL DEPLETION.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-TESTS CONDUCTED ON THE LOCK NUT WERE INCONCLUSIVE. A MINOR PROCEDURE CHANGE WAS MADE TO ASSURE POSITIVE LOCKING AND THAT THE VALVE WAS AT THE REQUIRED SETTING PRIOR TO FLIGHT.						
PROPULSION-WAS-A/B SUSTAINER	AOLB3-00317P4-403-00-113 TUBING	FLIGHT	1130 821003	14/YETR O.	YES NO	
FAILURE MODE-OUT OF EXPECTED VALUE. A FUEL LEAK MAY HAVE BEEN PRESENT, PROBABLY DOWNSTREAM OF THE PU VALVE.						
SYSTEM EFFECT-OPERATION TOO LOW. THE POSSIBLE FUEL LEAK WAS INDICATED BY A POSSIBLE HIGH FUEL FLOW RATE 4 PERCENT. LOW THRUST CHAMBER PRESSURE (10 PSI), AND LOW MISSILE SPECIFIC IMPULSE (7 SECONDS).						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-WAS-A/B SUSTAINER	AABE-0046/P6-4CO-05-71 PU AND MS VALVES, WEIRING	COMPOSITE-J FACT	104D 820302	36A/YETR O	NO NO	
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE SUSTAINER MS AND PU VALVES FAILED TO GO INTO CONTROL AND REMAINED FULL OPEN DURING THE TEST. THE FAILURE TO OPERATE WAS THE RESULT OF INADVERTENTLY USING GROUND WIRING FOR CONTROL PURPOSES AND THE GROUND WIRING WAS ISOLATED FROM THE VEHICLE AT UNLICAL EJECT.						
SYSTEM EFFECT-OPERATION DOES NOT START.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-GROUND CIRCUITRY WAS EXAMINED PRIOR TO SUBSEQUENT FACT.						

GENERAL DYNAMICS  
COMVAIR DIVISION

18 JAN 1966

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MAS-A/B SUSTAINER	ETR-017/14-312-1L-RE THRUST CHAMBER	CAPTIVE	000819	1-4/EDMA RDS	YES NO	
<p>FAILURE MODE-STRUCTURAL FAILURE-FOUR CHAMBER TUBES WERE SPILT 2 INCHES ABOVE THE THROAT.</p> <p>SYSTEM EFFECT-NONE-LEAK WAS INTERNAL TO THROAT OF CHAMBER. LEAK WOULD ALSO SLIGHTLY TO FUEL CONSUMPTION.</p> <p>VEHICLE EFFECT-POSSIBLE FIRE RESULTING LOSS OF VEHICLE. IF LEAK IS ON INSIDE OF THRUST CHAMBER FUEL WILL BURN UP IN TH NO EFFECT TO VEHICLE. IF LEAK IS ON EXTERNAL SURFACE OF THRUST COSE FIRE AND EXPLOSION COULD RESULT.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MAS-A/B SUSTAINER	ETR-009/14-303-C1-RE SUSTAINER LOX PUMP SEAL CAVITY	CAPTIVE	000304	1-4/EDMA RDS 0.9	YES NO	
<p>FAILURE MODE-FAIL DURING OPERATION. SEAL CAVITY PRESSURE INDICATED A SPIKE TO 9.2 PSIG AT 1 PLUS 0.8 SEC. POSSIBLY DUE TO AIAL DISPLACEMENT OF THE LOX PUMP SHAFT AT ENGINE START.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-UNKNOWN.</p>						
PROPULSION-MAS-A/B SUSTAINER	ETR-009/14-302-C1-RE SUSTAINER LOX REGULATOR	CAPTIVE	000304	1-4/EDMA RDS	YES NO	
<p>FAILURE MODE-LEAK EXTERNAL. DURING POST-TEST INSPECTION, A SMALL HOLE WAS DISCOVERED THROUGH THE BOTTOM OF THE REGU LATOR.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p> <p>CORRECTIVE ACTION-REGULATOR WAS REPLACED.</p>						
PROPULSION-MAS-A/B SUSTAINER	ETR-009/14-302-C1-RE SUSTAINER LOX PUMP, SHAFT	CAPTIVE	000304	1-4/EDMA RDS 1.	YES NO	
<p>FAILURE MODE-FAIL DURING OPERATION. SEAL CAVITY PRESSURE INDICATED A SPIKE TO 10.3 PSIG. POSSIBLE DUE TO AIAL DIAP LACEMENT OF THE LOX PUMP SHAFT AT ENGINE START.</p> <p>SYSTEM EFFECT-NONE.</p> <p>VEHICLE EFFECT-NONE.</p>						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-UNKNOWN.							002216
PROPULSION-WAS-A/B SUSTAINER	STR-008/14-505-CI-BE SUSTAINER GAS GENERATOR BLADE VALV E	CAPTIVE	000204	1-4/EDMA	YES	ROCKETDYNE	002216
FAILURE MODE-LEAK. LEAK WAS DISCOVERED IN THE FUEL SIDE OF THE BLADE VALVE DURING POST-TEST INSPECTION.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-BLADE VALVE WAS MODIFIED BY ROCKETDYNE.							
PROPULSION-WAS-A/B VERNIER	PE-702-00-5003 SWITCH-PRESSURE	COUNTDOWN	5001 000405	ETRI2 -2	YES NO	NAA	000369
FAILURE MODE-DURING IGNITION THE VERNIER FUEL MANIFOLD SWITCHES DID NOT INDICATE PRESSURE. INVESTIGATION REVEALED PLUGGING OF THE SENSE LINES BY HYPERGOLIC RESIDUE FROM THE ABORTED LAUNCH ATTEMPT ON 30 MARCH. THE SWITCHES THEMSELVES WERE IN SATISFACTORY CONDITION.							
SYSTEM EFFECT-OPERATION DOES NOT START IGNITION STAGE LIMITER INITIATED CUTOFF.							
VEHICLE EFFECT-THE LAUNCH WAS ABORTED.							
CORRECTIVE ACTION-ROCKETDYNE INITIATED PAPER WORK CLARIFYING PROCEDURES TO BE TAKEN AFTER AN ABORT.							
PROPULSION-WAS-A/B VERNIER	GO/CB/F85-087/LA-701-00-7113 START LOX TANK RELIEF VALVE	FLIGHT	7113 031100	2-4/PALC	YES NO		000949
FAILURE MODE-OUT OF EXPECTED VALUE. FOLLOWING VERNIER ENGINE LOX TANK PRESSURIZATION AT BECO, A PERIOD OF 30 SECONDS WAS REQUIRED FOR THE ENGINE LOX TANK TO REACH NOMINAL LOX SYSTEM TDC PRESSURE LEVEL WHEN 19 SECONDS IS MAXIMUM EXPECTED. HELIUM LEAKAGE THROUGH THE ENGINE LOX TANK HIGH PRESSURE RELIEF VALVE IS CONSIDERED MOST PROBABLE CAUSE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-GDC AND ROCKETDYNE ARE SUBMITTING A CHANGE FROM A BULKHEAD FITTING ON THE RELIEF VALVE TO A FLANGE FITTING. TESTING UNDER CRYOGENIC PRESSURE CONDITIONS INDICATES THAT THE BULKHEAD FITTING LEAKS.							
PROPULSION-WAS-A/B VERNIER	BE-400-01-01 CHECKVALVE	COMPOSITE-PRD/DPL	010 031100	03/MTN	YES NO		
FAILURE MODE-LEAK-EXTERNAL. ENGINE FUEL TANK VENT CHECK VALVE LEAKED.							
SYSTEM EFFECT-CONTAMINATION.							

GENERAL DYNAMICS  
CONVAIR DIVISION

10 JUN 1960

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
VEHICLE EFFECT-COUNTDOWN ABORTED.							004323
CORRECTIVE ACTION-CHECK VALVE REPLACED.							
PROPULSION-MAS-A/B VERNIER	GOC/22H63-023-DA1053-/LA-TNO-01-71 COMPOSITE-PRO/OML 12 BOTTLE STORAGE -LOX START TANK-	7112 090806	2-4/PALC	YES NO			009764
FAILURE MODE-LEAK-EXTERNAL. AT FULL SYSTEM PRESSURE A MINOR LEAK WAS DETECTED DURING POST TEST INVESTIGATION AT THE FITTING TO THE BOTTOM OF THE LOX START TANK.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE LEAK WAS REPAIRED.							
PROPULSION-MAS-A/B VERNIER	GOC/BAF63-051/P3-402-00-223/1496 PROPELLANT VALVE, POPPET	FLIGHT	2230 090780	13/ETR -1.9	YES YES		001810
FAILURE MODE-FAIL DURING OPERATION. AT 1-1.9 SECONDS THE V2 ENGINE BEGAN TO FLAME OUT AFTER 0.5 SECOND OF NORMAL ST ART-TANK-FED OPERATION, POSSIBLY DUE TO A MALFUNCTION OF THE LOX POPPET IN THE PROPELLANT VALVE.							
SYSTEM EFFECT-OPERATION TOO HIGH. AS A RESULT OF V2 SHUT DOWN, THE V1 ENGINE EXHIBITED ABNORMALLY-HIGH CHAMBER PRESSURE (APPROXIMATELY 10-PERCENT) FOR THE DURATION OF ENGINE OPERATION.							
VEHICLE EFFECT-PREATURE VERNIER ENGINE SHUTDOWN. DUE TO THE V2 LOSS, THE INCLINATION ANGLE OF THE FINAL ORBIT WAS 1.9 DEGREES LESS THAN PLANNED. SINCE THE ATTITUDE CORRECTIONS DURING VERNIER PHASE WERE COMPLETELY ACCOMPLISHED. THE MISSION OBJECTIVES WERE ACCOMPLISHED DESPITE THIS ERROR.							
CORRECTIVE ACTION-ROCKETRYME ISSUED MA-3 APIN 58 AND MA-2 APIN 19 TO CHECK PROPELLANT VALVES FOR LOW STRENGTH LOX P OPPT SHAFTS. ROCKETRYME ALSO CEASED USING REMORDED LOX POPPETS IN THE BUILDUP OF OVERHAULD PROPELLANT VALVES. VERNIER MANIFOLD PRESSURE SWITCHES IN THE VEHICLE RELEASE LOGIC HAS BEEN RECOMMENDED. ALSO ADDITIONAL FILTERS IN THE VERNIER AND AGE HAVE BEEN SUBMITTED.							
PROPULSION-MAS-A/B VERNIER	GOC/BAF63-051/P3-402-00-2230 PROPELLANT VALVE	FLIGHT	2230 090780	13/ETR -1.9	YES NO		
FAILURE MODE-FAIL DURING OPERATION. AT 1-1.9 SECONDS THE V2 ENGINE BEGAN TO FLAME OUT AFTER 0.5 SECONDS OF NORMAL ST ART-TANK-FED OPERATION, POSSIBLY DUE TO CONTAMINATION IN THE V2 LOX FEED SYSTEM.							
SYSTEM EFFECT-OPERATION TOO HIGH. AS A RESULT OF V2 SHUTDOWN, THE V1 ENGINE EXHIBITED ABNORMALLY HIGH CHAMBER PRESSURE (APPROXIMATELY 10 PERCENT) FOR THE DURATION OF ENGINE OPERATION.							
VEHICLE EFFECT-PREATURE VERNIER ENGINE SHUTDOWN. DUE TO V2 LOSS, THE INCLINATION ANGLE OF THE FINAL ORBIT WAS 1.9 DEGREES LESS THAN PLANNED, SINCE THE ATTITUDE CORRECTIONS DURING VERNIER PHASE WERE NOT COMPLETELY ACCOMPLISHED. THE MISSION OBJECTIVES WERE ACCOMPLISHED DESPITE THIS ERROR.							

19 JUN 1966

GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRPOCNE

SYSTEM SUB-SYSTEM	TEST-REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH	VENDOR NAME VENDOR PART NO
CORRECTIVE ACTION-OPEN. ADDITIONAL STRAINERS IN THE VERNIER AND AGE PLUMBING, AND INCORPORATION OF VERNIER MANIFOLD PRESSURE SWITCHES IN THE VEHICLE RELEASE LOGIC HAVE BEEN RECOMMENDED.						
PROPULSION-MA3-A/B VERNIER	GDC/BRP83-038/LA-701-00-7100 V1 THRUST CHAMBER	FLIGHT	7100 830327	2-4/PALC YES 135.000 YES		
FAILURE MODE-OUT OF EXPECTED VALUE. V1 PERFORMANCE CHANGE AT STAGING MOST PROBABLY THE RESULT OF A LOX LEAK BETWEEN THE GDC ORIFICE AND THE VERNIER PROP VALVE POSSIBLY DUE TO VIBRATION INDUCED AT BECO OR STAGING. 2) STAGE-LATCH FAULTURE WHICH RESULTED IN DISINTEGRATION AND SUBSEQUENT FLYING DEBRIS. 3) SHEARING OF STAGING BOLT DUE TO LATE ACTUATION AND SUBSEQUENT FLYING DEBRIS.						
SYSTEM EFFECT-OPERATION TOO LOW. DURING JETTISON THE V1 CHAMBER PRESSURE DECREASED 130 PSI AND REMAINED AT THIS LEVEL THROUGHOUT SUSTAINER PHASE. V2 DECREASE WAS INSIGNIFICANT (SP81).						
VEHICLE EFFECT-NONE. AS A RESULT OF THE V1 DECREASED THRUST WHEN VERNIER SOLO OCCURRED, THE V2 ENGINE MOVED INBOARD 25 DEGREES TO PROVIDE PROPER VEHICLE CONTROL IN YAW. AS A RESULT OF THIS, THE V2 EXHAUST GASES IMPINGED ON THE SUBSTAINER ENGINE INSTRUMENTATION PANEL TEMP PROBE WHICH CAUSED THE TEMP TO PEG OFF SCALE HIGH (GREATER THAN 550 F).						
CORRECTIVE ACTION-INSPECTION OF 8-NUTS IN THE VERNIER ENGINE SYSTEM AND THOROUGH PREFLIGHT INSPECTION OF THE VERNIER R AREAS. VIBRATION TESTING OF THE VERNIER ENGINE BY GDC DID NOT REVEAL ANY VERNIER DEFICIENCIES.						
PROPULSION-MA3-A/B VERNIER	GDC/BRP83-038/LA-701-00-7100 PROPELLANT VALVE	FLIGHT	7100 830327	2-4/PALC NO 130.		
FAILURE MODE-FAIL DURING OPERATION. LEAK IN THE V1 LOX LINE UPSTREAM OF THE GDC ORIFICE IN THE AREA NEAR THE VERNIER PROP VALVE. IF LOX WERE IMPINGING ON THE FUEL HALF THE VALVE COULD FREEZE. ALSO, IF LEAKAGE OF FUEL INTO THE VALVE OCCURRED THE POSSIBILITY OF FREEZING WOULD INCREASE.						
SYSTEM EFFECT-OPERATION TOO LOW. FREEZING OF THE FUEL HALF OF THE VALVE, WOULD PREVENT THE FUEL POPPET FROM CLOSING AT VECO AND WOULD EXPLAIN THE CONDITIONS WHICH OCCURRED. 1) FAILURE OF THE FUEL START TANK PRESSURE TO LOCKUP AND 2) V1 CHAMBER PRESSURE LEVEL AFTER CUT-OFF.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-TESTS PERFORMED BY ROCKETDYNE SHOWED THE VALVE COULD FREEZE AND THE PRESENCE OF FUEL IN THE VALVE WOULD INCREASE THE POSSIBILITY OF FREEZING. FURTHER TESTS WILL BE CONDUCTED WHERE LOX WILL BE SPRAYED ON THE LOX MANIFOLD OF THE VALVE.						
PROPULSION-MA3-A/B VERNIER	GDC/BRP83-038/P2-004-00-284 VERNIER LOX TANK PRESSURIZATION IN CHECK VALVE, POPPET	FLIGHT	8340 830322	12/ETR 137	YES NO	
FAILURE MODE-FAIL TO OPERATE. THE ISOLATION CHECK VALVE IN THE VERNIER ENGINE LOX TANK PRESSURIZATION LINE FAILED TO CLOSE WHEN THE LOX TANK PRESSURE ROSE ABOVE THE REGULATOR OUTLET PRESSURE.						
SYSTEM EFFECT-OPERATION TOO HIGH. THE 164 REGULATOR OUTLET PRESSURE AND THE VERNIER ENGINE FUEL TANK PRESSURE EXHIBITED ABNORMAL INCREASES (FROM 800 AND 800 PSIA RESPECTIVELY) TO 970 PSIA BETWEEN JETTISON (137 SECONDS) AND 150 SECONDS.						

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	DITE TIME DIF	PSI OTM	VENDOR NAME VENDOR PART NO	
NO3. REGULATOR PRESSURE THEN DECREASED TO 300 PSIA AND FUEL TANK PRESSURE MAINTAINED AT 870 PSIA UNTIL SECO.							001331
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-CHECK VALVE POPPET AND SEAT WERE REDESIGNED PER ECP MAS-146.							
PROPUSSION-MAS-A/B VERNIER	60C/BKFG9-019/L3-T02-00-7104 START LOX TANK RELIEF VALVE	FLIGHT	7104 050312	2-3/PALC 132	YES NO		000060
FAILURE MODE-OUT OF TOLERANCE. FOLLOWING VERNIER ENGINE LOX TANK PRESSURIZATION AT SECO, A PERIOD OF 30 SECONDS WAS REQUIRED FOR THE ENGINE LOX TANK TO REACH NORMAL LOX SYSTEM TEE PRESSURE LEVEL WHEN 15 SECONDS IS MAXIMUM EXPECTED. HELIUM LEAKAGE THROUGH THE ENGINE LOX TANK HIGH PRESSURE RELIEF VALVE IS CONSIDERED MOST PROBABLE CAUSE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-60C AND ROCKETDYNE ARE SUBMITTING A CHANGE FROM A BULKHEAD FITTING ON THE RELIEF VALVE TO A FLANG E FITTING. TESTING UNDER CRYOGENIC PRESSURE CONDITIONS INDICATES THAT THE BULKHEAD FITTING LEAKS.							
PROPUSSION-MAS-A/B VERNIER	50/C-BKFG9-010/A3-402-00-301 VERNIER ENGINE LOX TANK PRESS. LIN E CHECK VALVE	FLIGHT	3010 050302	A-3/MTR 137	YES NO	ROCKETDYNE	004770
FAILURE MODE-INTERNAL LEAK. THE VERNIER ENGINE LOX TANK PRESSURIZATION LINE CHECK VALVE FAILED TO CLOSE AT ENGINE V AND RE-PRESSURIZATION. THIS RESULTED IN THE VERNIER LOX FEED PRESSURE BEING REFLECTED BACK THROUGH THE 183 MANIFOLD AND INTO THE ENGINE FUEL TANK.							
SYSTEM EFFECT-OPERATION TOO HIGH. SUSTAINER PNEUMATIC REGULATOR OUTLET PRESSURE AND VERNIER ENGINE FUEL TANK PRESSURE WERE HIGHER THAN EXPECTED (870PSIA).							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REDESIGN OF POPPET AND SEAT OF CHECK VALVE PER ECP MAP-146. REVERSE FLOW TEST OF CHECK VALVE.							
PROPUSSION-MAS-A/B VERNIER	60A-AP204-075/A3-401-00-300 183 REGULATOR	FLIGHT	3000 041804	A-3/MTR 270	YES NO	ROCKETDYNE	003033
FAILURE MODE-ERRATIC OPERATION. 183 REGULATOR EXHIBITED IRREGULAR PRESSURE OSCILLATIONS OF ABOUT 30 PSI PEAK TO PEAK DURING VERNIER SOLO PHASE. CAUSE UNKNOWN.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE.							

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CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-NA3-A/B VERNIER	A3-4MO-01-210 VERNIER DISCONNECT O-RING	COMPOSITE-PRO/DPL	2100 641105	A-1/MTR	YES NO		097100
FAILURE MODE-LEAK-EXTERNAL. LARGE FUEL LEAK NOTED ON WE ENGINE HORIZONTAL RESIDUAL FUEL DRAIN QUICK DISCONNECT. CAUSED BY DETIORATION OF THE O-RING SEAL.							
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY.							
VEHICLE EFFECT-COUNTDOWN ABORTED.							
CORRECTIVE ACTION-LEAK REPAIRED.							
PROPULSION-NA3-A/B VERNIER	LY-98-06-3003F VERNIER ENGINE PURGE CHECKVALVE	FAR 27-021111-1	2090 641027	13/ETR	YES NO	YES MAROTTA	093800
FAILURE MODE-OUT OF SPECIFICATION. TWO UNITS REJECTED FOR OPENING SLIGHTLY BELOW SPECIFIED PRESSURE. DURING INVESTIGATION THE VALVES REPEATEDLY OPERATED PROPERLY.							
CORRECTIVE ACTION-NONE.							
PROPULSION-NA3-A/B VERNIER	60A-AP264-004/A3-401-00-247 135 PNEUMATIC REGULATOR	FLIGHT	2470 640922	A-3/MTR 272	YES NO	YES ROCKETDYNE	090422
FAILURE MODE-ERRATIC OPERATION. REGULATOR EXHIBITED IRREGULAR OSCILLATIONS OF ABOUT 60 PSI PEAK-TO-PEAK DURING VERNIER SOLO PHASE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE AT THIS TIME. ROCKETDYNE DOES NOT CONSIDER THIS A PROBLEM.							
PROPULSION-NA3-A/B VERNIER	60A-AP264-043/A3-401-00-245 BULKHEAD FITTINGS, ENGINE LOX TANK PRESSURIZATION	FLIGHT	2430 640815	A-1/MTR	YES NO		091200
FAILURE MODE-LEAK EXTERNAL. VERNIER SOLO LOX TANK PRESSURE EXHIBITED A PRESSURE SHIFT OF APPROXIMATELY 50 PSI 20 SECONDS AFTER REPRESSURIZATION AT BECO WHICH IS INDICATIVE OF A LEAK AT THE ENGINE LOX PRESSURIZATION FITTINGS.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-CHANGED FROM BULKHEAD FITTINGS TO FLANGE FITTINGS. ECP NA-100 AND 109.							

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CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPUSSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	DATE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO
PROPULSION-MAS-A/B VERNIER	60A/AP264-050 A84-303-F-3499 BULKHEAD FITTINGS, ENGINE LOW TANK PRESSURIZATION	FLIGHT	2400 040720	AS/UTR 150	YES NO	
FAILURE MODE-LEAK EXTERNAL. VERNIER SOLO LOW TANK PRESSURE EXHIBITED A PRESSURE SHIFT OF APPROXIMATELY 90 PSI 82 S SECONDS AFTER DEPRESSURIZATION AT DECO WHICH IS INDICATIVE OF A LEAK AT THE ENGINE LOW PRESSURIZATION FITTINGS.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-IT HAS BEEN RECOMMENDED TO CHANGE FROM BULKHEAD FITTINGS TO FLANGE FITTINGS.						
PROPULSION-MAS-A/B VERNIER	60A/AP264-035/A1-401-00-243 155 PNEUMATIC REGULATOR	FLIGHT	2430 040810	A-1/UTR 250	YES NO	
FAILURE MODE-ERRATIC OPERATION. REGULATOR EXHIBITED IRREGULAR OSCILLATIONS OF ABOUT 90 PSI PEAK-TO-PEAK DURING VEAN TER SOLO PHASE.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE. ROCKETDYNE DOES NOT CONSIDER THIS A PROBLEM.						
PROPULSION-MAS-A/B VERNIER	60A/AP264-035/A1-401-00-243 THRUST CHAMBER	FLIGHT	2430 040810	A-1/UTR -1.4	YES NO	
FAILURE MODE-ERRATIC OPERATION. FOLLOWING STABILIZATION ON PUMP FED OPERATION, Y1 AND WE CHAMBER PRESSURES EXPERIEN CED 40 PSI DROPS AND RECOVERY WITHIN 0.4 SECONDS.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-NONE. FLIGHT WAS CONSIDERED SUCCESSFUL.						
PROPULSION-MAS-A/B VERNIER	60A/AP264-010/L3-401-00-296 155 REGULATOR	FLIGHT	2900 040311	2-3 209.4	YES NO	
FAILURE MODE-EXTERNAL LEAK. CONTROL BOTTLE PRESSURE BEGAN A DECAY OF 380 PSI PER MINUTE IMMEDIATELY AFTER RETO-ROCK ET FIRING. THIS INDICATES A LEAK. EXACT TIME OF LEAK START CANNOT BE DETERMINED. LOCATION OF LEAK WAS DOWN STREAM OF 155 REGULATOR.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						

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CONVAIR DIVISION

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-NONE.							090297
PROPULSION-MA3-A/B VERNIER	22M44-002/DA990/L3-403-00-827 FITTINGS	COUNTDOWN 7-23287-081	2270 031218	2-3/PALC	YES NO		090109
FAILURE MODE-LEAKAGE EXTERNAL IN THE VICINITY OF THE V1 LOX BLEED VALVE WAS NOTED DURING THE COMMIT SEQUENCE AFTER THE ENGINE TANKS WERE PRESSURIZED.							
SYSTEM EFFECT-NONE VERNIER 1 ENGINE.							
VEHICLE EFFECT-COUNTDOWN DELAYED.							
CORRECTIVE ACTION-LOX WAS DETAINED AND ALL FITTINGS IN THE VICINITY OF THE VERNIER/LOX BLEED VALVE WERE CHECKED AND RETIGHTED.							
PROPULSION-MA3-A/B VERNIER	22M44-002/L3-402-00-827 VALVE-BLEED	COUNTDOWN	2270 031217	PALC/2-3	YES NO		090329
FAILURE MODE-LEAK-EXTERNAL WAS NOTED AT THE VERNIER 1 LOX BLEED VALVE DURING THE COMMIT SEQUENCE AFTER ENGINE TANKS PRESSURIZATION.							
SYSTEM EFFECT-DEPLETION OF LIQUID SUPPLY.							
VEHICLE EFFECT-COUNTDOWN ABORTED AND RESCHEDULED.							
CORRECTIVE ACTION-UNKNOWN. THE BLEED VALVE WAS REPLACED AND THE VERNIER SYSTEM LEAK CHECKED.							
PROPULSION-MA3-A/B VERNIER	60A63-006413-401-00-212 V1 LOX BLEED VALVE, B-NUT	FLIGHT	212D 930908	2-3/PALC	YES NO	ROCKETDYNE	090609
FAILURE MODE-FAIL DURING OPERATION. LOSS OF PNEUMATIC PRESSURE AT V1 LOX BLEED VALVE CONTROL PORT AT STAGING. COULD HAVE BEEN CAUSED BY FAILURE OF BLEED VALVE BODY OR CROSS-THREADING OF BLEED VALVE CONTROL BOSS. OTHER POSSIBILITY WAS LOOSE B NUT ON CLOSING CONTROL LINE BACKING OFF DUE TO VIBRATION. LOOSE B NUT MOST SUSPECT.							
SYSTEM EFFECT-OPERATION TOO LOW. PERFORMANCE OF THE VERNIER ENGINES DROPPED APPROXIMATELY 10 PERCENT AND WAS MARGINAL FROM STAGING TO MECO.							
VEHICLE EFFECT-NONE. THE ATLAS PLACED THE AGENA AND PAYLOAD AT THE PROPER SPACE POSITION FOR CONTINUATION OF THE MISSION BY THE SECOND STAGE.							
CORRECTIVE ACTION-NO ACTION ON VALVE. THE TORQUE SPECIFICATION OF THE B NUT TO BLEED VALVE CONTROL LINE WAS INCREASED FROM 40-55 INCH-POUNDS TO 70-100 INCH-POUNDS.							

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DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-NA3-A/B GENERAL	09A0311 LOX DISCONNECT VALVE ASBY	UTP-PET 87-02240-1,-3	000331	60/C	YES	REACTION MOTOR 310712V-310723 V	090177
FAILURE MODE-DURING THE LIFE TEST SCRATCHES WERE NOTED ON THE -3 PROBE SURFACE FOLLOWING LIFE CYCLE 9. LEAKAGE FROM THE -1 SECTION BECAME SEVERE AFTER LIFE CYCLE 14. THE LEAKAGE WAS A BLOWING SPRAY OF LIME FROM ABOUT 14 OF THE BOLTS HOLDING THE FLANGE							
CORRECTIVE ACTION-THE FAILURE WAS ATTRIBUTED TO OVERTESTING OF THE COMPONENT IN THE LIFE TEST WHICH INCLUDES 20 CRYOGENIC SEPARATIONS WITH MAXIMUM MISALIGNMENT NASA DESIGN REVIEWS ON 00-0-0 RESULTED IN A SLIP MAP TO STUDY TEST RESULTS AND TEST HISTORY. FINAL CLOSEOUT IS A FUNCTION OF THIS STUDY.							
PROPULSION-NA3-A/B GENERAL	09A0317 LINE ASBY--FLEX, FUEL START, 3/4 1 87-22500-003 NCH, FLANGE	UTP-PAT	000331	60/C	YES	60. CONVAIR	090174
FAILURE MODE-THE SPECIMEN LEAKED. ONE AT THE TORUSAL END WITH THE MAX ALLOWABLE TORQUE OF 940 IN/LBS. LEAKAGE RATE WAS 249 CC/MIN AGAINST A ZERO LEAKAGE SPEC. A TOTAL OF EIGHT ATTEMPTS EMPLOYING A NEW TORUSAL EACH TIME AND REMOVAL OF THE TEST FIXTURE FAILED TO PROVIDE THE REQUIRED ZERO LEAKAGE.							
CORRECTIVE ACTION-UNIT WAS REJECTED DUE TO A DEFECTIVE FLANGE NO FURTHER ACTION IS PLANNED.							
PROPULSION-NA3-A/B GENERAL	574-3-00-10 BOTTLE-CONTROL	FLIGHT	7110 000310	PALCE-4 JETT	NO NO	60/C	090411
FAILURE MODE-CONTROL BOTTLE PRESSURE EXHIBITED AN ABNORMALLY HIGH DECAY RATE FROM JETTISON ON DUE TO A LEAK DOWNSTREAM.							
SYSTEM EFFECT-DEPLETION OF CONTROL BOTTLE PRESSURE.							
VEHICLE EFFECT-PREATURE VERNIER ENGINE SHUTDOWN.							
CORRECTIVE ACTION-HARDWARE AND SIMULATION STUDIES ARE IN PROGRESS.							
PROPULSION-NA3-A/B GENERAL	574-3-00-10 TUBING-DUCTING	FLIGHT	7110 000310	PALCE-4 JETT	YES NO	NA3	
FAILURE MODE-CONTROL BOTTLE PRESSURE EXHIBITED AN ABNORMALLY HIGH DECAY RATE FROM JETTISON ON. THE LATTER PART OF THE SUSTAINER PHASE AND THE VERNIER PHASE WERE THEREFORE ABNORMAL. LEAKAGE IN THE BOOSTER FUEL BOOSTER PLUMBING IS SUSPECT.							
SYSTEM EFFECT-DEPLETION OF CONTROL BOTTLE PRESSURE AND LOSS OF DEPENDANT FUNCTIONS.							
VEHICLE EFFECT-PREATURE VERNIER ENGINE SHUTDOWN.							

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GENERAL DYNAMICS  
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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIF DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PRI OTM	VENDOR NAME VENDOR PART NO	
CORRECTIVE ACTION-HARDWARE AND SIMULATION STUDIES ARE IN PROGRESS.							890412
PROPULSION-HAS-A/B GENERAL	69A4744 VALVE	UTP-PE7 27-02231-7	640303	60/C	YES	B. W. MADLEY 10713-7	890173
FAILURE MODE-EXCESSIVE EXTERNAL LEAKAGE AROUND THE HANDLE DURING VIBRATION TESTS ON 64-3-1 AND 64-3-4. LEAKAGE RATE 8 UP TO 2000 CC/MIN OF GAS WERE OBSERVED AGAINST A TO CC/MIN SPEC THE REWORKED SPECIMEN WAS RETESTED ON 1 APRIL 68 A NO LEAKED AT A RATE OF 11,500 CC/ MIN. THE SECOND REWORK AND RETEST ON 64-4-13 RESULTED IN A 2490 CC/MIN RATE 120 PS 16 WAS USED IN ALL TESTS							
CORRECTIVE ACTION-LOT 710-1 WAS REJECTED A MORE REALISTIC EXTERNAL LEAKAGE RATE SPEC WAS INITIATED WHICH CHANGED THE ALLOWABLE LEAK RATE FROM 0.1 CC/MIN TO 8 CC/MIN.							
PROPULSION-HAS-A/B GENERAL	A1-4MO-01-303 REGULATOR-GAS	COMPOSITE-FRD/DPL 600224	3030	ADRESA-1	YES NO		890606
FAILURE MODE-ERRATIC OPERATION. THE 135 REGULATOR DID NOT RECOVER PROPERLY AFTER PRESSURIZATION AND VENTING OF STAR T TANKS. PRESSURE DECAYED TO 575 PSI AND THEN STEPPED TO 600 PSI.							
SYSTEM EFFECT-ERRATIC OPERATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-THE REGULATOR WAS REPLACED.							
PROPULSION-HAS-A/B GENERAL	69A6641 EXPLOSIVE VALVE	UTP-QUL/PPT 27-02293-3	640222	60/C	YES	PYROKINETICS 1182-1	890379
FAILURE MODE-FIVE AMPERES OF CURRENT WAS APPLIED TO BRIDGE WIRE A-0. THE SOLID FIRED AND THE VALVE OPENED HOWEVER CURRENT FLOW OF APPROXIMATELY 5.5 AMPERES CONTINUED THROUGH THE CIRCUIT. PRELIMINARY EXAMINATION OF CONTAMINANTS SHOW 8 ONE PARTICLE OF ALUMINUM APPROX 0.2 IN LONG.							
CORRECTIVE ACTION-ON 6-2-69 THREE TEST SPECIMENS WERE CHECKED FOR CONTAMINANTS. PARTICULAR ANALYSIS DETERMINED THAT THE VALVES ARE FLIGHT ACCEPTABLE BASED ON THE SMALL NUMBER AND SIZE OF THE PARTICLES. SPEC 27-12066 WAS REVISED TO REFLECT A MORE REALISTIC LIMIT ON PARTICLE SIZE.							
PROPULSION-HAS-A/B GENERAL	974-9-06-16 VALVE-CHECK	FLIGHT	3030 640210	ADRESA-1	YES NO	MAA	
FAILURE MODE-THE ISOLATION CHECK VALVE IN THE ENGINE LOW TANK PRESSURIZING LINE FAILED TO CLOSE AT ENGINE TANK DEPRESSURIZATION.							

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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE.							990394
CORRECTIVE ACTION-THIS IS A REPETITIVE PROBLEM. ECP MAS-146 WAS GENERATED FOR BLV VEHICLES WHICH CHANGED CHECK VALVE POPPET MATERIAL FROM RUBBER TO TEFLON. DBT HAS RECOMMENDED EXTENDING ECP MAS-146 TO INCLUDE AIR VEHICLES.							
PROPULSION-MAS-A/B GENERAL	949-1-009 TANK-FLUID	COMPOSITE-PRD/DPL	305D 940207	ABRSEA-1	YES NO		540879
FAILURE MODE-EXTERNAL LEAK. A LOW LEAK OCCURRED AT THE BOTTOM OF THE START TANK.							
SYSTEM EFFECT-LOW THERMAL ENVIRONMENT.							
VEHICLE EFFECT-COUNTDOWN DELAYED. DELAY IN THE DPL.							
CORRECTIVE ACTION-THE SEAL WAS REPLACED.							
PROPULSION-MAS-A/B GENERAL	P2-TBM-02-5001 ISS PACKAGE	COMPOSITE-PRD/DPL	5001 940205	ETRI2	YES N/A NO		990387
FAILURE MODE-ISS PACKAGE OPERATION WAS ABNORMAL. IRREGULARITIES INCLUDED FAILURE TO VENT THE START TANKS UPON COMBAT NO. IT WAS BELIEVED THAT THE FAILURE WAS DUE TO FREEZING.							
SYSTEM EFFECT-ERRATIC OPERATION.							
VEHICLE EFFECT-THE DPL WAS RESCHEDULED.							
CORRECTIVE ACTION- THE ISS PACKAGE WAS REMOVED AND RETURNED TO THE VENDOR FOR FAILURE ANALYSIS.							
PROPULSION-MAS-A/B GENERAL	B2-4HO-02-61 LOW START TANK-FILL AND DRAIN VALVE E SEAL	COMPOSITE-PRD/DPL	61D 950816	B2/MTR	YES ROCKETRY NO		990260
FAILURE MODE-LEAK EXTERNAL. LOW START TANK FILL AND DRAIN VALVE SEAL LEAKED-CAUSING LOW ENGINE COMPARTMENT TEMPERATURE.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-SEAL REPLACED ON LOW START TANK FILL AND CHECK VALVE.							

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO
PROPULSION-WAS-A/B GENERAL	PTA0979/PAB-CO-09-DACS CONNECTOR	COMPOSITE-J PACT	1810 090803	360/E7R -2	NO NO	997491
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. IGNITION STAGE LIMITER CUTOFF WAS GENERATED BECAUSE GANTRY TEST RA CK PLUGS P203 AND P204 WERE REVERSED (864 IGNITERS NO. 1 AND 2) PREVENTING COMPLETION OF CIRCUIT.						
SYSTEM EFFECT-IMPROPER DISCRETE SIGNALS.						
VEHICLE EFFECT-COMPOSITE DELAYED.						
CORRECTIVE ACTION-PLUGS INSTALLED CORRECTLY.						
PROPULSION-WAS-A/B GENERAL	60/C-BK763-009/A1-401-00-211 FITTING O-RING	FLIGHT	2110 050227	A-1/WTR 139	YES NO	995382
FAILURE MODE-OUT OF EXPECTED VALUE. AT ENGINE TANKS REPRESSURIZATION (DECON. ENGINE LOW TANK PRESSURE ROSE TO PNEUM ATIC REGULATOR. PRESSURE DID NOT REACH PUMP DISCHARGE PRESSURE, UNTIL 20 SECONDS LATER. THIS RISE NORMALLY OCCURS W THIN 15 SECONDS. BELIEVED DUE TO MEDIUM LEAKAGE PAST THE ENGINE LOW TANK PRESSURIZATION FITTING O-RING.						
SYSTEM EFFECT-NONE.						
VEHICLE EFFECT-NONE.						
CORRECTIVE ACTION-OPEN. REPLACED WITH FLANGE TYPE FITTINGS.						
PROPULSION-WAS-A/B GENERAL	99A4043 LOW STAGING DISCONNECT VALVE	UTP-PET 27-02249-1	050127	60/C	YES NO	990291
FAILURE MODE-LEAK-EXTERNAL DURING PET BURST PRESSURE TEST WHILE PRESSURIZING THE FORWARD SECTION HYDROSTATICALLY LE AKAGE STARTED FROM THE STATIC SEAL AT 150 PSIG. BY 210 PSIG THE LEAKAGE RATE EXCEEDED THE PRESSURE SUPPLY RATE. DESI GN BURST PRESSURE IS 222 PSIG. LEAKAGE RATES WERE 60 CC PER MINUTE AT 100 PSIG AND 908 CC PER MINUTE AT 120 PSIG. T HE STATIC SEAL BOLTS HAD RELAXED TORQUE FROM 120-130 IN-LBS TO ACTUAL TORQUE OF 25-30 IN-LBS. REF S/N 401023 T. M. N OE.						
CORRECTIVE ACTION-NONE. REF CICTH NO 642-8-017.						
PROPULSION-WAS-A/B GENERAL	99A4043 LOW STAGING DISCONNECT VALVE	UTP-PET 27-02249-1/-3	080129	60/C	YES NO	310722/310723
FAILURE MODE-OUT OF SPECIFICATION OR TOLERANCE DURING PET LIFE CYCLE 19 (OF 20) THE ENGAGED AND MISALIGNED TEST SPE CIMENT, FILLED WITH LUB PRESSURIZED TO 90 PSIG GME AND 117 PSIG GME LEAKED 1.14 CU-IN PER MINUTE AND 1.39 CU-IN PER M INUTE. ALLOWABLE IS 1 CU-IN PER MINUTE LMG. LATER VERIFICATION TESTING UNDER SAME CONDITIONS OBTAINED 0.978 CU-IN PE R MINUTE AND 1.70 CU-IN PER MINUTE. REF 401-023/40127 T. M. NO 1.						

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GENERAL DYNAMICS  
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## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
							000230
	CORRECTIVE ACTION-NONE. REF. C7C7H NO USE-8-014						000230
PROPULSION-MAS-A/B GENERAL	60A-AP284-088/A1-402-00-210 133 PNEUMATIC REGULATOR	FLIGHT	2100 841201	A1/MTA 200	YES NO	YES ROCKETDYNE	000230
	FAILURE MODE-ERRATIC OPERATION. IRREGULAR OSCILLATIONS WITH MAGNITUDE OF ABOUT 30 PSI PEAK-TO-PEAK WERE EXHIBITED BY THE 133 PNEUMATIC REGULATOR OUTLET PRESSURE DURING VERNIER SOLO PHASE.						
	SYSTEM EFFECT-NONE.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-NONE. ROCKETDYNE DOES NOT CONSIDER THIS A PROBLEM.						000230
PROPULSION-MAS-A/B GENERAL	A3-400-01-300 VALVE-CHECK	COMPOSITE-PRO/DPL	3000 841021	A-2/MTA	YES NO		000230
	FAILURE MODE-FAIL DURING OPERATION. ABNORMAL START SYSTEM PERFORMANCE AFTER START TANKS WERE VENTED.						
	SYSTEM EFFECT-ERRATIC OPERATION.						
	VEHICLE EFFECT-NONE.						
	CORRECTIVE ACTION-INVESTIGATION REVEALED THE LOX VERT PORT CHECK VALVE WAS NOT INSTALLED ON 133 PLS BUT RATHER A PLUG WAS INSTALLED.						000230
PROPULSION-MAS-A/B GENERAL	69A1907.3 LOX STAGING DISCONNECT VALVE	UTP-PRT 27-02248-17-3	840903	507C	YES NO	THIOL 310722/310723	000230
	FAILURE MODE-OUT OF SPECIFICATION OR TOLERANCE DURING A SPECIAL PRT POST VIBRATION PROOF CYCLE WITH TEST SPECIMEN ENGAGED AND FILLED WITH LNE PRESSURIZED TO 117 PSIG, THE ENGAGEMENT SEAL LEAKAGE WAS 12000 CC GME PER MINUTE. ALLOWABLE IS 11,432 CC GME PER MINUTE (1.0 SCIN LOSS). REF 8/N 008-0017/304-1106 T. N. NO.3						
	CORRECTIVE ACTION-NONE. REF. 8/N PRT NR P-4339 37 AND PRT NO PRT50-2-387						
PROPULSION-MAS-A/B GENERAL	69A1907.3 LOX STAGING DISCONNECT VALVE	UTP-PRT 27-02248-17-3	840729	507C	YES NO	THIOL 310722/310723	000230
	FAILURE MODE-OUT OF SPECIFICATION OR TOLERANCE DURING PRT POST VIBRATION PROOF CYCLE WITH TEST SPECIMEN ENGAGED AND FILLED WITH LNE PRESSURIZED TO 117 PSIG, THE ENGAGEMENT SEAL LEAKAGE WAS 2.1 CUBIC INCHES OF LNE PER MINUTE. ALLOWABLE IS 1.0 SCIN. AN EXAMINATION OF THE VALVE REVEALED A TROUGH AREA ON THE REL-P LIP SEAL AND EMERALON COATING CHIPPED OF FORWARD SECTION DUE TO PROBE BOTTOMING. REF 8/N 008-0017/304-1106 T. N. NO.3						

GENERAL SYNDICES  
COMPAID DIVISION

13 APR 1966

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM NO-37378	TEST/REPORT NUMBER FAILED COMPONENT NAME	S/P DATA SOURCE PART NUMBER	VEHICLE DATE DIF	SITE TIME DIF	PR1 O/M	VEHICLE NAME VEHICLE PART NO
090233	CORRECTIVE ACTION-INSTALL NEW O-RING, CLEAN PROBE AND SEAL AREA, AND RETURN PROOF CYCLE. REF. R174 FOR NO P-4333 37 AND FOR NO FR 834-Q-387.					
099824	PROPULSION-MS3-A/B GENERAL CD/ABCFM4-023/A4-T02-00-7101 ALL ENGINE THRUST CHAMBERS, THER	FPF	7101 840820	2-4/PALC NO	NO	
	FAILURE MODE - CONTAMINATION. POST TEST INSPECTION REVEALED THAT THE ENGINE PURGE SYSTEM DID NOT OPERATE PROPERLY AFTER ALL ENGINES CUTOFF. INVESTIGATION REVEALED THAT PROBLEM WAS CAUSED BY A FAULTY START FAILURE DELAY TIMER (220A1 RJ1). AS A RESULT ALL ENGINES WERE CONTAMINATED.					
	SYSTEM EFFECT-CONTAMINATION. ALL THRUST CHAMBER INJECTOR MANIFOLDS WERE CONTAMINATED AND REQUIRED REMOVAL AND DISCARD PRIOR TO FLIGHT.					
	VEHICLE EFFECT-NONE. DELAY IN LAUNCH WOULD HAVE OCCURRED IF PAYLOAD HAD BEEN READY.					
	CORRECTIVE ACTION-TIMER WAS REPLACED AND CHECKED OUT SATISFACTORILY.					
090602	PROPULSION-MS3-A/B GENERAL A1-4NO-03-843 REGULATOR	COMPOSITE-FPD/DPL	2430 840611	A-1/MTR	YES	ROCKETDYNE
	FAILURE MODE-OUT OF TOLERANCE. 133 REGULATOR OUTPUT OUT OF TOLERANCE.					
	SYSTEM EFFECT-START SYSTEM PRESSURE LOW.					
	VEHICLE EFFECT-NONE.					
	CORRECTIVE ACTION-133 REGULATOR REPLACED.					
090600	PROPULSION-MS3-A/B GENERAL A1-4NO-02-843 REGULATOR	COMPOSITE-FPD/DPL	2430 840609	A-1/MTR	YES	NO
	FAILURE MODE-OUT OF SPECIFICATION. 133 REGULATOR RECOVERY TIME AT START WANK PRESSURIZE INCREASED FROM THAT ON PREVIOUS BPL.					
	SYSTEM EFFECT-OPERATION TOO LOW.					
	VEHICLE EFFECT-NONE.					
	CORRECTIVE ACTION-133 REGULATOR REPLACED.					

GENERAL DYNAMICS  
CONVAIR DIVISION

15 JUN 1966

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTH	VENDOR NAME VENDOR PART NO	
PROPULSION-MAS-A/B GENERAL	DA1010/L3-4MO-03-331 REGULATOR, INTEGRATED START SYSTEM	COMPOSITE-FRD/DPL	3510 840480	2-3/PALC	YES NO		094833
FAILURE MODE-OUT OF EXPECTED TEST VALUE. REGULATOR DISPLAYED UNUSUAL TRANSIENTS AT ENGINE TANKS PRESSURIZATION.							
SYSTEM EFFECT-ERRATIC OPERATION.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-REGULATOR REPLACED.							
PROPULSION-MAS-A/B GENERAL	62483-1274/11-401-00-233 ISS REGULATOR	FLIGHT	2330 631216	A-1/ETR 276	YES NO	YES ROCKETDYNE	091630
FAILURE MODE-ERRATIC OPERATION. OSCILLATIONS WITH A MAXIMUM PEAK-TO-PEAK AMPLITUDE OF 130 PSID WERE INDICATED ON THE ISS REGULATOR DISCHARGE PRESSURE DURING VERNIER SOLO PHASE. THE CAUSE IS UNKNOWN.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-NONE CORRECTIVE ACTION TAKEN.							
PROPULSION-MAS-A/B GENERAL	PTA2834/P2-4CO-02-243	COMPOSITE-J FACT	2830 630827	12/ETR 0	NO NO		097693
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. EA PEN 31 (MAIN ENGINES COMPLETE) ACTIVATED AFTER EA PEN 32 (PRE DE LEASE CUTOFF DISARM). PEN 31 SHOULD ACTIVATE PRIOR TO PEN 32. PROPER ACTIVATION OF PEN 32 WAS VERIFIED.							
SYSTEM EFFECT-NONE.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-UNKNOWN.							
PROPULSION-MAS-A/B GENERAL	P3-4CO-04-197 ENGINE RELAY BOX, RELAY K17	COMPOSITE-J FACT	1970 630823	13/ETR	YES NO		093251
FAILURE MODE-OUT OF TOLERANCE. DELAY BELIEVED EXCESSIVE.							
SYSTEM EFFECT-OPERATION TOO LONG. TIMER SETTING IS BELIEVED TO BE EXCESSIVE AT APPROX 0.6 SEC.							
VEHICLE EFFECT-NONE.							
CORRECTIVE ACTION-INVESTIGATING TO DETERMINE PROPER TIME DELAY.							

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GENERAL DYNAMICS  
CONVAIR DIVISION

## DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PHI OTM	VENDOR NAME VENDOR PART NO
PROPULSION-WAS-A/B GENERAL	ADJES-0048/AI-401-00-103 REGULATOR TUBE	FLIGHT	1980 030316	A-1/MTA 158	NO NO	993100
FAILURE MODE-FAIL DURING OPERATION. 150 PNEUMATIC REGULATOR DISCHARGE PRESS. DROPPED FROM 375 PSIG AT 156 SECONDS T O 65 PSIG AT 240 SECONDS. HELIUM SUPPLY LINE FAILED BETWEEN THE 185 REG AND THE FIRST CONSTANT FLOW CONTROL CHECK VALVE IN PU SYSTEM DUE TO SHOCK AND VIBRATION ENVIRONMENT AFTER BOOSTER CUTOFF.						
SYSTEM EFFECT-DEPLETION OF GAS SUPPLY. LOSS OF SUBST. CONTROLS BOTTLE PRESS. BY 237 SECONDS. THE PRESSURE WAS ZERO.						
VEHICLE EFFECT-LOSS OF VEHICLE STABILITY. MISSILE SELF DESTRUCTED AFTER 240 SECONDS AND TANK SECTION IMPACTED APPROXIMATELY 300 NAUTICAL MILES DOWNRANGE.						
CORRECTIVE ACTION-NONE.						
PROPULSION-WAS-A/B GENERAL	AX83-0003-2000/FC-00-01-0213-008 ENGINE RELAY BOX	COMPOSITE-FACTORY	2000 030022	FACTORY 470	YES NO	999624
FAILURE MODE-OUT OF TOLERANCE. MEASUREMENT 3374X INDICATED 3 PERCENT ISM DURING ACTIVATION OF TONE CHANNELS 1 AND 3 AT 470 SECONDS DUE TO FAULTY ENGINE RELAY BOX PROBLEM.						
SYSTEM EFFECT-OPERATION TOO LONG. POSSIBLY NO SECO.						
VEHICLE EFFECT-COMPOSITE RESCHEDULED. POST-COMPOSITE TESTING REQUIRED. POSSIBLE LATE SUSTAINER ENGINE SHUTDOWN.						
CORRECTIVE ACTION-REPLACED FAULTY ENGINE RELAY BOX.						
PROPULSION-WAS-A/B GENERAL	AA62-0043/P8-4CO-04-F1 ENGINE RELAY BOX, RELAY-SUSTAINER FLIGHT LOCKIN	COMPOSITE-J FACT	1040 020317	364/ETR 0	NO NO	992427
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. 6TR SIMULATOR CABLES CONNECTED TO THE 866 NO. 1 AND NO. 2 RECEPTACLES WERE REVERSED WHICH RESULTED IN THE FAILURE OF THE SUSTAINER FLIGHT LOCKIN RELAY TO ACTIVATE THEORETICALLY GIVING CUTOFF.						
SYSTEM EFFECT-OPERATION DOES NOT START.						
VEHICLE EFFECT-COMPOSITE DELAYED. RECYCLE 25 MINUTES.						
CORRECTIVE ACTION-CORRECT JUMPER.						
PROPULSION-WAS-A/B GENERAL	AA62-0002/P8-4CON-07-104/C-1 ENGINE RELAY BOX, V START AND PRESS S. CIRCUIT	COMPOSITE-PRO/OPR	1040 011022	364/ETR 0	YES NO	999624
FAILURE MODE-FAIL TO OPERATE AT PRESCRIBED TIME. THE ENGINE START TANKS DID NOT VENT WHEN THE SWITCH WAS MANUALLY 8 TRIPPED TO VENT. THE CAUSE OF THIS PROBLEM WAS A REDUNDANT JUMPER IN THE ENGINE START AND PRESSURIZE TANKS CIRCUITS.						

GENERAL DYNAMICS  
CONVAIR DIVISION

15 JUN 1968

DIFFICULTIES REVIEW-PROPULSION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRI OTM	VENDOR NAME VENDOR PART NO
	SYSTEM EFFECT-OPERATION DOES NOT START. THE ENGINE START TANKS DID NOT VENT WHEN THE SWITCH WAS MANUALLY STEPPED TO VENT. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-VENT START TANKS BY MOMENTARILY INTERRUPTING MISSILE DC POWER. REMOVE JUMPER AFTER THE TEST.					
PROPULSION-MAS-A/B GENERAL	AAS1-0020/P4-102-00-87 PRE-VALVE-FLANGE	COUNTDOWN	870 810221	14/ETR YES NO		
	FAILURE MODE-LEAK-EXTERNAL. AFTER X-1 DAY FUEL TANKING, LEAKS WERE NOTED BETWEEN THE BOOSTER FUEL PRE-VALVE AND STA GING VALVE FLANGE AND AT THE SUSTAINER TURBINE FUEL COOLANT BEARING RELIEF VALVE. SYSTEM EFFECT-NONE. VEHICLE EFFECT-NONE. CORRECTIVE ACTION-LEAKS CORRECTED BY REPLACING THE GASKET BETWEEN THE PRE-VALVE AND FLANGE AND REPLACING THE SUSTAI NER TURBINE FUEL COOLANT BEARING RELIEF VALVE.					
PROPULSION-MAS-A/B GENERAL	99A1987-E LOX STAGING DISCONNECT VALVE	UTP-ETT 27-02249-17-3		60/C YES THICKOL NO 3107221/310723 V		
	FAILURE MODE-LEAK-INTERNAL. DURING DISCONNECT TEST PHASE OF ETT AT 43 PSIG LEAKING LINE VISIBLE LEAKAGE WAS OBSERVED T HROUGH THE ENGAGEMENT SEAL. VALVE WAS AT MAXIMUM MISALIGNMENT. THE VINYL COLLECTION BAG BROKE SO NO VALUES WERE OBT AINED. NO ADDITIONAL LEAKAGE OCCURRED LATER IN TEST. REF S/N 110-1943/301-1004 T.H. NON. CORRECTIVE ACTION-NONE. REF. RTPN FOR NR P-4257 ST AND FOR NO PR 834-E-890.					

GENERAL DYNAMICS  
COMVAST DIVISION

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DIFFICULTIES REVIEW-PROPELLION SYSTEM-AIRBORNE

SYSTEM SUB-SYSTEM	TEST/REPORT NUMBER FAILED COMPONENT NAME	DIP DATA SOURCE PART NUMBER	VEHICLE DATE DIP	SITE TIME DIP	PRZ OTH	VENDOR NAME VENDOR PART NO